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NOGRAPH OF TESTUDINATA.

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No.
ACADEMY OF NATURAL SCIENCES
OF
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Presented by the Author
18

Tortoises

A

MONOGRAPH

OF THE

TESTUDINATA.

BY

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MONOGRAPH OF TESTUDINATA.

PART I. CONTAINS

PLATES.	LETTER-PRESS.
1. Testudo pardalis, *upper side.*	Introduction, *sheets* a & b. ✓
2. Testudo pardalis, *under side.*	Testudo pardalis, *half-sheet.* ✓
3. Testudo tabulata, *upper side*	Testudo tabulata, *one sheet.* ✓
4. Testudo tabulata, *under side.*	Emys spinosa, *half-sheet.* ✓
5. Emys spinosa, *2 views.*	

PART II. Contains

PLATES.	LETTER-PRESS.
1. Testudo carbonaria, *upper side.*	Introduction, *sheet* c. ✓
2. Testudo carbonaria, *under side.*	Testudo carbonaria, *one sheet.* ✓
3. Testudo angulata, *2 views.*	Testudo angulata, *one sheet.* ✓
4. Testudo actinodes, *upper side.*	Testudo actinodes, *one sheet.* ✓
5. Testudo actinodes, *under side.*	

N.B. The third plate of Testudo carbonaria will appear in a future Part.

PART III. Contains

PLATES.	LETTER-PRESS.
1. Testudo areolata.	Testudo areolata, *one sheet.* ✓
2. Terrapene clausa.	Terrapene clausa, *one sheet and a half.* ✓
3. Emys scabra, *upper side.*	Emys scabra, *one sheet.* ✓
4. Emys scabra, *under side,* with the egg.	
5. Emys Tectum.	Emys Tectum, *half a sheet.* ✓

N.B. The Introduction will be continued in the future Parts.

PART IV. Contains

PLATES.	LETTER-PRESS.
1. Testudo carbonaria, *B.*	Introduction, *sheet d.* ✓
2. Trionyx labiatus, *upper side.*	Trionyx labiatus, *one sheet.* ✓
3. Trionyx labiatus, *under side.*	
4. Trionyx labiatus, *Dorsum and Sternum.*	
5. Kinosternon scorpioides, *two views.*	Kinosternon scorpioides, *one sheet.* ✓

N.B. The letter-press of *Testudo carbonaria* appeared in Part II.

PART V. Contains

PLATES.	LETTER-PRESS.
1. Testudo signata, *three views.*	Introduction, *sheet* e.
2. Emys lutaria, *upper side.*	Testudo signata, *half-sheet.* ✓
3. Emys lutaria, *under side.*	Emys lutaria, *one sheet.* ✓
4. Emyda punctata, *upper side.*	Emyda punctata, *one sheet.* ✓
5. Emyda punctata, *under side.*	

Part VI contains

✓1 Testudo geometrica 3 views	Testudo geometrica 1 sheet
✓2 Testudo radiata upper side	Testudo radiata 1 sheet
✓3 Testudo radiata under side	Emys decussata 1 sheet
✓4 Emys decussata upper side	
✓5 Emys decussata under side	

PART VII. Contains

PLATES.	LETTER-PRESS.
1. Testudo tentoria, *three views.*	Introduction, *sheet* f. ✓
2. Emys concentrica, *a. upper side.*	Testudo tentoria, *half-sheet.* ✓
3. Emys concentrica, *under side.*	Emys concentrica, 1½ *sheet.* ✓
4. Emys concentrica, *b.*	
5. Emys concentrica, *c.*	

PART VIII. Contains

PLATES.	LETTER-PRESS.
1. Emys spinosa, *adult.*	
2. Cyclemys orbiculata.	Cyclemys orbiculata, *one sheet.*
3. Cyclemys orbiculata, *under side of a younger and an adult individual.*	
4. Chelodina longicollis.	
5. Chelodina longicollis, *under side.*	Chelodina longicollis, *one sheet.*

The Introduction will be continued in the next Part.

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INTRODUCTION.

The immense extent of the animal creation, and the boundless variety of forms which crowd upon the attention of the most desultory observer, render the acquisition of even a general and superficial knowledge of the whole science, the labour of a life. It is, indeed, the splendid and enviable lot of few, to grasp with a master mind, like that of Aristotle, of Linnæus, or of Cuvier, the whole range of the animal world; and to combine the advantages of leisure and opportunity with the power of seizing, by an almost intuitive perception, the nature and value of the relations by which beings are associated. The true naturalist, even of a humbler grade, will not indeed be satisfied without acquiring some general views of organization; but circumstances of taste or opportunity will, in most cases, point out some one or other of the larger groups, to which his attention will, for a time at least, be directed, to the comparative exclusion of the rest.

Of the various branches into which the science of Zoology has thus been divided, Erpetology, or the study of the Reptilia, has perhaps been the most neglected. The superiority of organization in the Mammifera, with the interest attached to the habits of many species, and the utility of others, administering as they do to our daily wants or comforts,—the elegance of form, the splendour of plumage, and the sweetness of note, which render the different families of Birds so attractive,—even the varied beauty of the shelly covering of the testaceous Mollusca,—but, above all, the endless varieties of form which characterize the insect tribes, and the never-ceasing fascination which the contemplation of their habits is calculated to excite, have necessarily attracted the devotion of most of the votaries of this delightful branch of natural knowledge.

The Reptilia cannot, it must be acknowledged, offer such ostensible sources of amusement or interest as these: but to the philosophical student of Nature,—to him who seeks in his investigations for something beyond the mere gratification of the eye and ear, or the amusement to be derived from watching the changes of an insect, or the nidification of a bird,—to him, in short, who, in the expanded and almost boundless view of Nature which lies before him, endeavours to trace something of the great plan on which this world of life has been organized, and to ascertain the very principles of that mighty and harmonious system, of which every variety of form, and every grade of organization constitutes an essential part,—no class of beings, however forbidding their outward appearance may be, or with whatever attributes of dread and disgust superstition may have invested them, can be otherwise than interesting, and deserving the most careful and profound investigation.

It is obvious that in proportion to the extent of our acquaintance, not only with those types of form which indicate the centres of the different groups, but with the nicer gradations of structure which form the passage from one group to another, or the links by which they are associated, will be our means of advancing in the pursuit of this most important and interesting object, to which the anxious attention of every true naturalist has been directed, from Aristotle downwards to MacLeay. It is not that every species of a group—especially of some of the most extensive, and which contain numerous species of nearly the same form,—can be viewed as equally important: the decision, for instance, of every doubtful species of the Colubridæ would be but a trifling and unimportant addition to our knowledge, with respect to the great object to which I have alluded; yet how often does it happen that an individual which, from superficial examination perhaps, or from the want of comparison, had been considered as isolated and bearing no near or important relation to any other form, proves, by the discovery of other intermediate species, or by further investigation of its own characters, to be the essential link in some important chain of affinity, or the analogical key to some corresponding form in another group. The distinct and certain settlement of disputed synonymy, too, cannot be considered as a very important object of the labours of the naturalist; yet even this, to an orderly and well-regulated mind, will be a source

of no small satisfaction; whilst the results, in the elucidation of the geographical distribution of animals, and still more in ascertaining the identity or diversity of recent and fossil species, give to this more humble branch of our zoological studies, an importance which does not at first sight appertain to it.

To all these objects the writer of Monographs essentially contributes. He acts as the pioneer, removing obstacles, and clearing the ground to be afterwards occupied by the more efficient force, whose evolutions would be continually impeded and their plans disordered, but for the assistance of their laborious predecessors.

In composing a Monograph of the present Order, there is no difficulty in ascertaining its exact limits, nor danger of committing the error either of introducing an individual belonging to any approximating group, or of rejecting as doubtful any one which really appertains to this. There is in fact scarcely any group of animals which, according to our present knowledge, is so distinctly circumscribed by peculiarity of structure, as the Testudinata. The circumstance of the limbs being placed within instead of on the outside of the trunk, and the osseous union of the ribs, forming a sort of bony box, including not only the viscera but the members, are characters which at once separate them from every other known group. Whether future investigations, either in recent or especially in fossil zoology, may discover the links by which these singular animals are connected, by continuous affinity, with any of the groups from which at present they appear to be so distinctly separated, we cannot now even conjecture; but at present they certainly remain the most isolated order, not only amongst the Reptilia, but perhaps in the whole animal kingdom.

As the species which inhabit the Continent of Europe and the seas which were navigated by its ancient inhabitants, are but few, we look in vain to the Classical writers on natural subjects for any but the most vague and uncertain notices respecting them. That the four species of marine turtles were known both to the Greeks and Romans, is indeed scarcely to be doubted, as three of them are occasionally found in the Mediterranean, and the fourth, *Chelonia imbricata*, furnished their merchants with the precious tortoise-shell,—an article of luxurious decoration, which appears to have been much used in ornamenting the palaces and villas of the Roman nobles. The soft-bodied species of this

family, *Sphargis mercurialis,* is common on the coasts of the Mediterranean, and is supposed to have furnished the body of the ancient lyre; and hence the tortoise was dedicated to Mercury, the fabled inventor of that instrument. It is however scarcely probable that the ancients generally discriminated between the different marine species,—those three at least which are covered with horny plates,—excepting for the purposes of commerce.

It was probably to *Terrapene europœa,* the common lake tortoise of the South of Europe, that the death of the celebrated dramatic poet Æschylus was attributed; as Pliny distinctly states that the eagle, through whose means the catastrophe occurred, is a frequenter of lakes. He, to avoid the fulfilment of an augury, which threatened him with death by means of a falling house, is said to have gone into the fields, where an eagle, carrying aloft a tortoise in his talons, and mistaking the bald head of the poet for a round smooth stone, let his prey fall upon it in order to break the shell, and broke, instead thereof, the skull of the gifted and eloquent victim of this fatal mistake*.

It is unnecessary however, and would be equally unsatisfactory, to trace the vague and uncertain notices given by the writers of the earlier ages, respecting these animals. Even when the mutual intercourse of distant countries had become greatly extended, and commerce had gradually enlarged our information respecting the natural productions of the remotest parts of the world, the animals in question still remained little known and imperfectly distinguished. It matters little, indeed, what species were known to such authors as Aldrovandus, or Bontius and Piso, or what were the originals intended to be represented by the barbarous caricatures, which rather obscured than illustrated the works of that period. But passing by the older writers, it is matter of no small disappointment to find that even the great Father of method, the illustrious Lin-

* "Tertii (generis Aquilarum) Morphnos, quam Homerus et Percnon vocat, aliqui et Plancnum, et anatinam, secunda magnitudine et vi: *huicque vita circa lacus.* Ingenium est ei testudines raptas frangere e sublimi jaciendo: quæ sors interemit poetam Æschylum, præditum fatis (ut ferunt) ejus diei ruinam secura cœli fide caventem." *Plin. Nat. Hist.* lib. x. cap. 3.

It is a curious coincidence that the eagles of South Africa are generally believed to have a similar instinct to that attributed to the species alluded to by Pliny. The account is given in the Voyage of Kolbe to the Cape of Good Hope; but as I have not the work to refer to, I give it as quoted by Daudin. "Suivant ce voyageur les grands aigles de mer, nommés *orfraies,* sont très-avides de la tortue; malgré toute la force de leur bec et de leurs serres, ils ne pourroient briser sa dure enveloppe; mais ils l'enlèvent aisément, ils l'emportent au plus haut des airs, d'où ils la laissent tomber à plusieurs reprises sur des rochers très durs; la hauteur de la chûte et la très grande vîtesse qui en résulte produisent un choc violent; et la couverture de la tortue, bientôt brisée, livre en proie à l'aigle carnassier, l'animal qu'elle auroit mis à couvert, si un poids plus considérable avoit résisté aux efforts de l'aigle pour l'enlever dans les nues." *Daud. Hist. Rept.* ii. p. 300.

næus, is so vague and general in his specific characters, as often to leave us to mere conjecture as to the species which he designs; the characters of which he constitutes his specific distinctions being, in many instances, such as apply generally to a whole group, and, with some exceptions, to the greater part of the order. Of him in fact who consults the genus Testudo of the *Systema Naturæ,* it may be said without exaggeration, in the words of Schœpff, "Inveniet enim nomina vaga, descriptiones plerasque mancas, ambiguas, in diversissima sæpè quadrantes animalia, immo et diversissimis applicatas." Gmelin indeed acknowledges, "Similitudinem structuræ in generalibus, varietatem singularum specierum pro varia ætate, cognitionem plurium in variis vitæ periodis imperfectam esse, et difficilem reddere testudinum diagnosin et mancam illarum historiam." In this passage are contained the most striking causes of that uncertainty and vagueness which rendered the *Systema Naturæ* so unsatisfactory an authority, as it regards these animals; still it must be granted that this great naturalist ascertained, with considerable accuracy, the characters which distinguish the marine, the lacustrine, and the terrestrial forms; and it is probable that, had he been acquainted with a greater number of species, he would have acquired those accurate views of the relations and value of their characters, which would have constrained him to multiply his genera, and probably also to appreciate the real rank and importance of the whole group.

There cannot be a higher practical attestation to the merits of this extraordinary man, than the fact, that even the most bigoted admirers of modern systems, who follow novelty for its own sake—no less than those more original and philosophical investigators of nature, who are obliged, by the very increase of their information, to acknowledge the deficiencies of his system—are constrained to adopt most of his groups, though they may assign to them a different grade in the scale. It is unpleasing to witness the paltry attempts which are every day made by the pygmies of science, to underrate and cavil at the views of that giant mind, whom they only affect to depreciate because they are unable to comprehend him. It is not, however, to the servile herd of imitators, that this attempt to preach a sort of crusade against the merits and memory of Linnæus is confined: some of the most gifted of our contemporaries, whose talents and acquirements give them a legitimate claim to more positive and independent

honours, have not hesitated to join in the cry, and to depreciate the merits of those views upon which, modified and improved by their own enlarged opportunities, they endeavour to raise an independent and personal claim to originality.

It matters little to the true interests of science, although it may be of some consequence to our own convenience, whether a certain assemblage of species be termed a Subgenus or a Genus, a Family or an Order; whether we restrict the appellations of groups to the terms Kingdom, Class, Order and Genus, admitting intermediate anonymous sections or divisions, or whether we introduce such terms as Subkingdom, Family, Tribe, Cohort, Subgenus, and the rest of the thousand and one names which have sometimes aided, and perhaps as often burthened the mind of the student. To appreciate duly the advantages which Natural History has derived from the labours of the learned Swede, we should consider not only the state of the science when he undertook the Herculean task of reducing it to order, but the immense range of objects to which he endeavoured to apply his newly discovered views. It is perhaps no unfair test of a writer's claim to individual merit, to measure that claim by the meed of credit which he himself awards to the real deserts of others. Were this rule to be fairly applied, how many of the popular authors of the present day would sink into nothingness when compared with those great and original minds which they affect to contemn, but to which they ignorantly owe perhaps all that is really meritorious in their own vaunted productions. It is fair to avail ourselves honestly and openly of all the advantages to be obtained from the labours of our predecessors; but it is unfair, it is degrading to the science we profess, when, by a fraud, not often punishable by human laws, but not the less contrary to sound faith and honour, we desecrate, as it were, the sublime and holy object of our devotion, the grandeur and purity of which might well shame us from conduct so disgraceful, and excite in us feelings elevated far above such mean and unworthy considerations.

The confusion in which Linnæus left the Testudinata was but little improved by his successor Gmelin, who, though he considerably augmented the number of names, added but little to our real information as to the characters of the species. An attempt was made by Schneider* to embody, in a descrip-

* *Allgemeine Naturgeschichte der Schildkröten*; von Johan Gottlob Schneider, 1783.

tive monograph, the species then known, which, according to his list, amounted to eighteen; of these, three are probably the young of species otherwise named in the same list, which reduces the number known by this naturalist to fifteen. His descriptions are generally sufficiently full for the purpose of ascertaining the species intended; but it is also evident, from the stress which he lays upon some of the general characters, that he was not aware of their real value, nor able to distinguish between those which belong to a whole division of the group and those which characterize species only. The "Chelonographia" of Wallbaum, and the scattered additions made about the same period by other writers, prepared the way for that portion of the "Histoire Naturelle des Quadrupèdes ovipares et Serpens," which relates to Tortoises, by the Comte de Lacépède, who contributed this addition to the celebrated "Histoire Naturelle" of the Comte de Buffon. It would be no easy matter to analyse satisfactorily this elaborate work. That much was effected by it towards the improvement of Erpetology cannot be denied; but so much confusion of names and characters still remained to perplex the student of this branch of Zoology, as to leave perhaps little room for unqualified praise. The uncertainty which, from the first, attached to the specific distinctions of these animals, arising from the want of attention to the essential characters, and the differences existing between the young and adult state of many species, still obtained. The total absence, also, of anything like a fully illustrated monograph was, under these circumstances, a fatal obstacle to the acquisition of a correct knowledge of the described species.

This great desideratum was however undertaken by Schœpff, who, in 1792, commenced his "Historia Testudinum*." His object was to give figures of every known species; but his premature death prevented the completion of the work. As far as it went, the figures are exceedingly correct and well executed; the accounts of the species full and clear, and the lists of the synonyms evince not only an extensive acquaintance with all that had before been written on the subject, but also no inconsiderable judgement in ascertaining and clearing up the doubtful and confused synonymy of previous authors. There is, however, no attempt at arrangement; the whole of the species are still included under the one generic term *Testudo*, and the land, the fresh-water, and

* J. D. Schœpff, *Historia Testudinum iconibus illustrata*. Erlangæ, 1792, et sequent.

the marine forms are intermingled without the slightest regard to classification. This was no doubt occasioned by the periodical form in which the work was published; but it is evident that no ultimate arrangement was intended, as the whole book is continuously paged.

The History of Reptilia, by Latreille and Sonnini, consists of little more than a modification of Lacépède. Daudin* however, in his work, which formed a continuation of Sonnini's Buffon, took higher ground. By establishing several new and natural genera of Serpents, &c., he proved himself capable of correct and original views; and in his descriptions of the Tortoises, he not only discriminated with considerable accuracy, but, by his enlarged and full descriptions, rendered the comparison and elucidation of synonyms a more easy task. The first attempt at applying a distinct name to any one of the different forms, appears in his application of the term "Chelones" to the whole of the marine species.

The appearance of that portion of Shaw's "General Zoology†", in this country, in the same year as that in which Daudin published his work in France, renders it difficult to assign the right of priority in those cases in which it has happened that the two authors described the same new species‡.

It is however to Brongniart that we owe the first marked and important improvement in the arrangement of these animals. He first recognised their proper rank in the system, considering the whole group as constituting a distinct order, to which he applied the term "Cheloniens," which has been adopted by most subsequent naturalists, either in its French form, or with a Latin termination. To him also the merit is due, of giving to many of the minor groups distinct generic names, all of which, though with many additions, have been since retained. Whatever merit therefore may belong to the subsequent improvements of Geoffroy, of Oppel, of Schweigger, and many others, to whose labours I shall have occasion again to allude, we cannot refuse to Brongniart

* *Histoire Naturelle generale et particulière des Reptiles*;—suite au Buffon de Sonnini. An X. XI.

† General Zoology, by George Shaw, M.D. &c., vol. iii. Part I. 1802.

‡ This has occurred in the case of *Testudo radiata* of Shaw, to which Daudin gives the name of *T. Coui*. As Shaw derived his knowledge of the species from a specimen already described in Grew's "Curiosities of the Museum of the Royal Society," of which work Daudin was evidently ignorant, I have thought it right to retain the name given by the English naturalist, especially as it has been recognised by every subsequent author.

the praise of having first broken through the contracted notions which had been previously held respecting the Testudinata*. The charm once broken, it was found that several other types of form existed, of sufficient importance to require distinct generic appellations. For example, Geoffroy gave an excellent paper† on the fluviatile species which have a coriaceous covering, and other equally distinct characters, to which he gave the name *Trionyx*. Schweigger had already assigned to them in manuscript the name *Amyda;* and as Geoffroy was aware of this fact, from Schweigger's manuscript having been submitted to him before the publication of his own Monograph, it is not easy to imagine why he suppressed it, and employed a new one of his own.

In 1820 Merrem published his "Tentamen Systematis Amphibiorum," a work in which the discoveries of former authors are embodied with considerable improvements of his own, both in arrangement and nomenclature. His separation of the Batrachia from the Reptilia as a distinct class, is an important alteration, in which he is borne out equally by their anatomy and physiology; and his arrangement of the Reptilia in orders, though not free from some obvious objections, evinces a considerable acquaintance with the subject, and no slight degree of originality in his views. The application of ordinal terms, founded upon the character of the integument, is ingenious, and has the advantage at least of uniformity and convenience. For the present order he adopts, from Oppel, the name TESTUDINATA; a term which I have, upon mature consideration, retained as more advantageous and less liable to objection, than any other that has been suggested. The grounds upon which I have made this choice, will be stated hereafter. The attempt of this author to give to every species an essential character wholly independent of colour, renders the bulk of his work almost useless, excepting for the sake of its very extensive synonymy.

The Monograph of Schweigger‡ deserves especial mention, as being much more complete than any that had previously appeared, and as having anticipated some improvements which have since been made by other authors who

* *Essai d'une Classification naturelle des Reptiles*, par A. Brongniart: Paris 1805. See also a Paper by the same author in the *Bulletin des Sciences par la Soc. Philom.* No. 35.

† *Mémoire sur les Tortues molles, nouveau Genre sous le Nom de Trionyx*, par Geoffroy St. Hilaire: *Annales du Muséum d'Hist. Nat.* tom. xiv. p. 15.

‡ *Prodromus Monographiæ Cheloniorum*, auctore Schweigger: Konisberger Archiv fur Naturwischenschaft, &c. 1812.

were ignorant of that excellent paper. The original intention of this naturalist was to produce a full and complete Monograph of the order, illustrated by plates. To this undertaking he was led by its having been proposed by the French Institute in 1809; but being prevented, at that time, from fulfilling this intention on the extensive plan at first proposed, he published his Prodromus in 1812, though without abandoning his original object, the accomplishment of which his untimely death* has now unhappily rendered hopeless. Had that project been carried into effect, the present work would have been unnecessary; and it is matter of great regret that so correct a hand as that of Schweigger had not completed the task, the outline of which he had so well sketched. This tract, from its having appeared in a work comparatively little consulted by naturalists in general, has escaped the notice of several subsequent writers. Merrem in particular, whose synonyms are so numerous as to prove that he has examined almost every previous work on the subject, was wholly ignorant of that of Schweigger, the publication of which had preceded his own by several years.

Notwithstanding that the excellence of Schweigger's work consists, in a great degree, in its clearness and precision with regard to the identification of species, and that in many instances the difficulties arising from the different appearances of the same species at different ages are cleared up, and the discordant synonyms of former authors corrected,—yet when it is considered that the information which he possessed of actual specimens, went but little further than the collection of the Paris Museum, it will not appear wonderful that even these objects should have been but imperfectly fulfilled. He enumerates seventy-eight species, from which more than thirty must be deducted, either as varieties, or as repetitions of the same species, described under different names and copied erroneously from other authors.

A new classification of Reptilia by Fitzinger†, appeared in 1826, in which the class is divided into two orders: the first, termed *Monopnoa*, includes all those which respire air during the whole of life,—the Reptilia of Merrem; the second, *Dipnoa*, consists of the *Batrachia*. The Testudinata are here re-

* Schweigger was assassinated by his guide during a journey in the interior of Sicily.

† *Neue Classification der Reptilien, nach ihren Natürlichen verwandtschaften, &c.* von L. I. Fitzinger: Wien, 1826.

duced to the rank of a Tribe, and are divided into five families, which were adopted, though with considerable improvements, by Mr. Gray. This arrangement differs but little from the quinary distribution which I proposed at nearly the same period*, and without any knowledge of the existence of such a work as Fitzinger's. The differences which exist between the method of this author and that which I proposed, are almost all in favour of the former; and I have adopted the general plan, with the improvements of Mr. Gray, and some subsequent modifications of my own, in the present work.

In 1830 a work, purporting to present "a Natural System of the Amphibia†," made its appearance, from the pen of Dr. Wagler. The unnecessary and unnatural multiplication of genera, founded upon very trifling distinctions, into which this author has divided the Testudinata, appears to me to evince a very inadequate appreciation of the true importance of characters, and is remarkably contrasted with an error of the opposite kind in some other parts of his work; whilst the quotations from other authors are in some cases so incorrect as to convey an exactly opposite impression to that originally intended‡. The Plates which illustrate the work, and of which one fasciculus only has yet appeared, comprising the Testudinata, are beautifully executed, and exhibit not only the external form, but the anatomical characters also, of each genus.

Passing over those casual additions to our information, which have now and then appeared in the description of new species, or the occasional establishment of a genus, I proceed, with mingled pleasure and reluctance, to make a few observations on a portion of the "Synopsis Reptilium" of Mr. Gray, first published as an Appendix to Griffiths's translation of Cuvier's "Regne Animal," and subsequently, with considerable alterations, as a distinct work§. As my object at present is not so much to give a critical examination of the different authors to whom I may have occasion to allude, as to point out to whom we are most indebted for the gradual improvement of our knowledge in this

* This had remained unpublished for a considerable period, and at length appeared in the Zoological Journal, vol. iii. p. 513.

† *Natürliches System der Amphibien &c.* von Dr. Joh. Wagler: München &c. 1830.

‡ See particularly the characters of my genera *Kinixys* and *Pyxis*. The essential character of the former, as given in the Linnæan Transactions, is, "*Dorsi* pars *posterior* mobilis." Dr. Wagler gives it, "Thoracis pars *antica* mobilis." This is in fact the character of *Pyxis*, of which this author says, "Thoracis pars *postica* mobilis."

§ Synopsis Reptilium; or Short Descriptions of the Species of Reptiles: by John Edward Gray, &c. Part I. 1831.

particular department of Natural History; I am enabled to pass over in but few words, the less agreeable part of my duty with regard to the publication now before me. But it would be unjust were I to bestow unqualified praise, where the examination of any single page would show that favour, and not justice, must have dictated so partial an appreciation of its merits.

The faults which generally appertain to Mr. Gray's work, may be in part attributed to haste, and to the author's extreme anxiety not to omit a single known species from his catalogue, whether before described or not. The continual occurrence of incorrect typography, too, would perhaps scarcely deserve mention, were it not, in many instances, entirely subversive of the right understanding of the author's meaning. But the frequent adoption of the discoveries of other naturalists, not only without acknowledgement, but with the name of Gray appended as the sign of appropriation, must not be passed over in silence, though I gladly leave so unpleasant a duty with this mere allusion. Allied to this fault is the application of the altered generic name of a former author, to a portion of the original genus, now first considered as distinct, and appropriated by this author. An instance of this occurs in the name *Emyda*, given by Mr. Gray to a part of the genus *Trionyx* of Geoffroy. Now the whole genus was originally named *Amyda* by Schweigger, and improperly put aside by Geoffroy to give place to his own name of *Trionyx*. The mere alteration of a single letter is too slight a deviation to allow us to consider it as an accidental coincidence, though it may be sufficient, in Mr. Gray's view, to give him the right of assuming the name *Emyda* as his own. The Synopsis however is, notwithstanding all these defects, by far the most correct and extensive that has yet appeared; but though its excellencies may well disarm us of asperity in our animadversions on its faults, they make us the more feelingly regret the blemishes with which it is so sullied.

GEOGRAPHICAL DISTRIBUTION.

The Testudinata, like the other Reptilia, are essentially confined to torrid and temperate regions. Although most of them thrive in warm or even hot climates, yet some species of each of the principal groups, excepting the small one of the *Trionychidæ*, are found inhabiting countries of considerably lower temperature. The fresh-water forms generally appear to be capable of bearing a higher latitude than the terrestrial. *Testudo græca* is not, I believe, found farther north than 45°; whilst *Terrapene europæa*, a fresh-water species, is said to be found in Hungary, Silesia, and even in Prussia*, that is to say, as high as 50° to 53° or 54°; it is commonly found near Bourdeaux, and in the North of Italy: and *Emys caspica* inhabits the shores of the Caspian Sea. The American species of land tortoise, *T. tabulata*, is not found north of the river Savannah; whereas the fluviatile and lacustrine species are common in Pennsylvania, and even in States still further north; and I have even received *Emys picta*, an American lacustrine species, from Hudson's Bay, from whence it was brought in the same box with skins of the Arctic fox, and other animals of that region. I cannot however speak with any certainty of the exact situation in which it was taken.

In the Southern Hemisphere, these animals are found as far as 40° S. lat. *Testudo indica* (probably introduced), *T. pardalis*, *T. geometrica*, *Hydraspis galeata*, and several others, inhabit the Cape of Good Hope; and in New Holland are found *Hydraspis longicollis* and *Emys porphyrea*. I have not heard of any species being indigenous to Van Diemen's Land.

Upon the whole, the utmost range of the Testudinata appears to be from 54° N. lat. to about 40° S. lat.

The distribution of the genera and species is a matter of no small interest. There are few genera of which some species are not found both in the Old and New World; but I am not acquainted with a single species, excepting the Marine Turtles, which can be considered indigenous to both hemispheres. This is an important fact, and enables us to correct many erroneous statements respecting the species described by former authors. The only apparent exception to this

* Wulff, *Ichthyologia*, &c.

rule is that of *Testudo indica,* which is found on the Gallapagos, at the Cape of Good Hope, and in India. From all the information I have been able to obtain, I feel convinced that it is originally and truly indigenous only to the former habitat, having been naturalized in the other countries, after being casually introduced through the medium of commerce. The writings of Lacépède and of other writers of his period, are replete with errors of this kind. Thus *Testudo græca* is referred to Europe, Asia, Africa and America, as its different habitats. It is indeed only within a few years that the geographical distribution of animals has been considered in the important light which it deserves; and the mistakes which arose from the want of giving it its due consideration, have consequently been, in many instances, corrected. It is however equally important that we avoid laying down rules of this kind as universal, without sufficient information. It is certainly an interesting fact, that in the case of birds, of insects, and of some other classes, there are very many whole groups which, according to our present knowledge, appertain exclusively to the Eastern or the Western World. In the present order, this obtains only to a very limited degree. The genus *Testudo,* it is true, is, generally speaking, a form belonging to the Old World; but there are two species, nearly allied to each other, *T. tabulata* and *T. carbonaria,* which inhabit the Continent of America, besides *T. indica,* found on the Gallapagos. Species of the genus *Emys* are found in each of the four quarters of the globe,—a statement which is generally true of all the fresh-water forms, excepting the genus *Chelydra,* the only recent species of which is exclusively American. I have however a fine fossil species of this genus (*Ch. Murchisonii,*) from Œningen, which differs only from *Ch. serpentina* in some proportions of different parts of the skeleton. The genus *Hydraspis* is principally confined to South America, yet *H. galeata* is a native of the Cape of Good Hope, of India, and of Madagascar, and *H. longicollis* of Australia. The *Emydes* of the two Hemispheres have some remarkable distinguishing characters, by which they may be readily discriminated. To these peculiarities I shall have occasion to recur. The species of the genus *Trionyx* are African or Asiatic, with the single exception of *Tr. ferox,* which inhabits the hot regions of America.

NATURAL HISTORY AND HABITS OF THE TESTUDINATA.

The habits of Tortoises appear at first sight to offer but scanty materials for the observation of the student of Nature, or the records of her historian. It would however be indeed an anomaly in natural history, were this tribe of animals to exhibit nothing in their manner of life which should interest the zoologist —no illustrations of creative design in their structure, no remarkable instances of instinct in their habits, nothing in the phænomena of their organization to satisfy the researches of the physiologist. The more we become familiarized with their manners and mode of life, and the further our investigations are carried into the effects of external agents in modifying the natural circumstances of their existence, the more we shall feel satisfied that even in these sluggish and cold-blooded creatures,—the slowness of whose pace has become a proverb, and their inactive and torpid life a common illustration of the vices of idleness and sloth,—the law of all nature still holds good, that nothing has been formed in vain, and that the structure of every animal alike displays the wisdom and perfection of the great plan of creation, and the accurate adaptation of organs, at once to internal function and to external habits.

A moment's consideration of the organization of these animals will prepare us to look for and to understand some of the most remarkable and interesting of their habits. Partaking, with the rest of the Reptilia, in the imperfect nature of the respiratory and circulating systems, it results that the body is incapable of keeping up any standard degree of temperature, which changes therefore with every alteration of the surrounding atmosphere. They are in fact what are termed cold-blooded animals. The mutual relations which exist between any one function of the animal body and all the others,—the reciprocal dependence of the functions of circulation, of respiration, of nervous activity and power, of digestion and secretion,—the intimate connexion, in short, by which all these functions are made to vary according to the variations of any one of them, receive the most striking and beautiful illustration in the habits of the Testudinata, as well as of all other forms of the Reptilia; and at once account for and require all those peculiarities which distinguish them from other classes of animals. Deriving their animal heat, then, only from external

sources, it follows that the animal functions must be carried on with a greater or less degree of activity and power, according to the temperature of the surrounding atmosphere. Hence we find that, in common with all other reptiles, they are not only enabled to sustain long fasts, but in fact digest their food only in proportion to the heat of the climate. In cool weather they take food but seldom, digest it slowly, and will even live for many months, and even for years, without any nourishment. Their respiration, circulation, muscular motion, and every other function, are diminished in a corresponding degree. When the temperature sinks to a certain point, the functions of life gradually cease to act; the animals refuse to feed, the respiration becomes slower and slower, the circulation more and more languid, and a state of torpidity, almost resembling death itself, takes place, in which condition they remain during the winter, and until the return of spring, by its increasing temperature, renews their action, and restores them to their natural state of life and activity.

The Testudinata are obviously composed of three distinct principal groups, of which the conformation bears a striking and satisfactory relation to their habits and mode of life. These are the terrestrial, the fresh-water, and the marine forms; and the characters by which they are distinguished are so constant and so influential on their situation, food, and other circumstances of their history, as to justify a separate consideration. I shall however first give such a general description of their structure, as may be necessary to illustrate their history and their zoological characters, though without entering at present into any detailed account of their anatomy.

The peculiar structure of the heart, upon which the imperfect condition of the circulation depends, consists in the ready communication of the two chambers of the ventricle. The blood, as in the higher animals, enters the heart by two auricles, of which the right receives the blood which has been circulated through the body, and the left that which has been aërated in the lungs. But in the ventricle the two kinds of blood become more or less mixed, so that neither is that portion which is sent to the general system, absolutely decarbonized, nor is that which goes to the lungs, to receive the necessary change, in such a state of impurity as when it arrived at the heart after having gone through the general circulation.

The structure of the lungs and the condition of the respiratory function are strictly analogous to this imperfect state of the circulation. Instead of being formed, as in the warm-blooded animals, of a close congeries of innumerable minute cells, far more compact than the most solid sponge, the cells are here large and comparatively few, and occupy, in some parts, the parietes only of the spacious sacs of which these organs consist. The quantity of blood exposed to the influence of the air at any one time, must therefore be very small, and the decarbonization in a corresponding degree imperfect. In exact correspondence with these facts, the mode of respiration is also extremely circumscribed. Deprived, by the osseous agglutination of the ribs and sternum, of all motion of the chest, and being also unprovided with a diaphragm, the inhalation of air is obviously impossible: inspiration is therefore performed by a simple act of deglutition. By the expansion of the pharynx, air is received into that cavity through the nostrils, the posterior openings of which are then closed by the application of the tongue, whilst the opening of the pharynx into the œsophagus is also shut, by the circular contraction of that part. The air tube is consequently the only passage left open, and by the contraction of the pharynx, the air is forced through it into the lungs. Expiration is effected by means of certain muscles, hereafter to be described, which are situated at the back part of the body, and which, by their contraction, force the viscera of the abdomen forwards, and thus pressing upon the lungs, occasion the partial expulsion of the air. Thus the structure of the lungs, the circumscribed mode of inspiration, and the partial evacuation of the lungs in expiration, all combine to render the respiratory function imperfect; whilst the mixture of the two kinds of blood in the heart, also renders the more frequent or complete act of respiration unnecessary, as there always remains some aërated blood to mix with that which is impure.

But the character by which these animals are at once distinguished from all other Vertebrata, is the solid bony box, within which all the viscera are inclosed, and which, in most genera, covers also the head, tail and limbs, when the animal is at rest. The upper portion of this osseous case, called the carapace or buckler, is formed of the dorsal vertebræ and ribs, which are immoveably connected by sutures, not unlike those of the cranial bones in most Mammifera,

excepting that the lines are not interrupted by any undulating or zigzag inequalities. The inferior portion of this effectual armour, consists of the sternum; and the two portions are more or less intimately connected, in the various families, by intervening bones, which must be considered as analogous to the cartilages of the ribs in the Mammifera, and which, in fact, in some genera, remain, to some extent, permanently cartilaginous.

The varieties of form and of development which this part assumes, in the different groups of tortoises, constitute some of the most constant and essential characters by which they are distinguished, and at the same time perfectly accord with the structure of the neck, feet, and tail.

The Testudinidæ or Land Tortoises, which are exposed to continual attacks and dangers, from which their sluggish movements prevent their escape, unprovided as they are with any kind of weapons of offence, require defensive armour of the most secure kind, and capable of affording the strongest resistance to external injury. They are therefore provided with a hard, solid and compact shell, forming an elevated arch, which is calculated to sustain immense pressure. In addition to this, the neck and head can be drawn wholly within the shell; and the legs—the solid and clumsy structure of which can only permit that slow progress by which these animals are characterized,—are admirably adapted, by this very peculiarity of form, as well as by the manner in which they are articulated, and the hard strong scales which, in most cases, protect the anterior portion of them, to defend the more important and vital parts within. Thus, when the animal is at rest, the head and neck are wholly concealed, and the legs entirely occupy the anterior opening between the upper and lower parts of the shell, which opening, in this family, is small and contracted, consistently with the circumscribed extent of motion required by the feet.

In the family of the Emydidæ, or those fresh-water tortoises which approach most nearly in their structure to the foregoing group, the shell is much flatter, and both the anterior and posterior openings between the dorsal and pectoral shields are much more expanded, in order to allow of the more free and extensive motion of the limbs in swimming. The feet also are more slender and moveable; and the toes, instead of being contracted, as in the former case, into

a solid obtuse stump, are considerably expanded, and connected by a membrane, so as to form powerful paddles. The claws, too, which in the Testudinidæ are short and thick, are, in these, long, sharp and strong, to enable them to tear the animal prey on which they subsist.

In this family there is a small group in which the characters indicate a manifest approximation to the Testudinidæ. These are the Box Tortoises, in which we find the limbs more robust, the shell higher and less expanded, and, in short, all the characters intermediate between the terrestrial and the fluviatile forms. The sternum in these is divided into two or three portions, by one or two transverse sections: of these the anterior at least, and in many the anterior and posterior, are moveable; being connected by means of a ligamentous or cartilaginous hinge; and are capable of more or less accurately closing the shell, when the animal is at rest. Of these the *Terrapene clausa* may be considered as approaching most nearly to the Land Tortoises, and *Terrapene europæa* as the most closely allied to the fresh-water group.

The Trionychidæ exhibit perhaps the most remarkable and interesting structure in the whole order. They consist of those tortoises, inhabitants of the fresh water, which have no horny plates covering the shell, or any other part of the body. Instead of this more usual covering, they are invested with a strong coriaceous skin, which covers equally the dorsum and sternum, to the bones of which it is closely attached: there is also a free margin of the same leathery substance; and this circumstance, with the remarkable flatness and expansion of the animal, constitutes a form admirably adapted for concealment in the mud, at the bottoms of rivers and lakes; whilst the extraordinary length of the neck, and the powerful muscles by which it can be suddenly protruded, enable the animal to seize its prey by an instantaneous effort, without the necessity of always quitting its retreat.

Another peculiarity of this group is, that the three outer toes only, of each foot, are furnished with claws. The bones of the sternum are separate, and the ribs are generally united only through a part of their length.

The structure of the marine family, the Cheloniadæ, exhibits the natatorial character in the highest degree, and at once points out these animals as permanent inhabitants of the sea. The whole body is flat,—the shell so small as

in no instance to allow of the retraction of the head and limbs,—and the feet are modified into perfect fin-like oars; the toes being flat and far asunder, and the whole of them enveloped in a continuous and undivided skin. These animals are all marine, and generally vegetable feeders. One species, constituting the genus *Sphargis*, is covered with a leathery skin, instead of the horny plates which form the usual protection of the osseous shell.

Such is a brief, but necessary sketch of those characters of the principal groups or families of the Testudinata, which appear to determine their habits and modes of life. It will be obvious that so meagre a sketch can only be intended to render intelligible, the account of their natural history which follows.

Whilst we see, in the other classes of the Vertebrata, the functions and enjoyments of life provided for by the attributes of strength, of fleetness, or of acute powers of sensation; or, where these are wanting, by such a peculiar development of the mental faculties, as shall equally avail their possessor in the fulfillment of those destinies which appertain to him in the situation which he holds in the scale of being; we turn, with a feeling of disappointment, to the sluggish, torpid habits, and rude, ungainly structure which characterize most of the Testudinata. But although these animals have not the power of escaping from danger by swiftness of foot, they are provided, instead of such a means of safety, with a hard solid case, impervious to the teeth even of beasts of prey; a shelter more secure than the burrow of the marmot or the mole. Although they cannot, like the migratory birds, wander from place to place, on the approach of winter, in search of a more genial climate, yet their peculiar conformation renders such a change unnecessary, by producing a greater or less degree of torpor and insensibility as the cold advances, until every faculty and function of life becomes extinct, and sensation itself is rendered less and less capable of suffering, exactly in proportion as the cause of pain and distress, in the higher grades of animal life, increases. It is not only in those animals whose habits are most obviously interesting, that we are to look for illustrations of the wisdom and power of the Creator, and of the universal adaptation of the structure of animals to their habits: in this respect the tortoise and the

toad are as perfect examples of creative wisdom, as the orang or the beaver, the bee or the ant. But even amongst the Testudinata, the vital powers are developed in very different degrees in the different forms. The Land Tortoises, even in the tropical climates in which they most abound, and the temperature of which is calculated to raise their sluggish powers to the greatest degree of activity compatible with their organization, are still the awkward, slow-moving beings to which so many opprobrious proverbs have been applied; and the utmost extent of improvement of which they are susceptible, is an almost ludicrous attempt at vivacity, which seems only to show how little external circumstances can modify those habits which structure has limited and controlled. But amongst some of the Fresh-water forms, the carnivorous habits by which they are characterized require a rapidity and extent of movement widely different from the contracted motions of the former group. Thus *Chelydra serpentina*, the Snapping Turtle as it is commonly called, a native of the lakes and rivers of South America, not only pursues its prey, which consists of fish and of young water fowl, with great velocity and vigour, but seizes it with a rapid and powerful movement of the neck, and a sudden snap of the jaws, sufficiently forcible, as I have myself seen, to cut asunder a small stick. The movements, indeed, of many of the fresh-water species, when pursuing their food, or escaping from danger, are characterized by considerable speed and power.

The food of Tortoises varies according to their structure, and the situation to which that structure adapts them. The land tortoises generally feed on vegetable substances, preferring the succulent or milky plants of the natural order Compositæ; such at least is the case with those which I have observed in a state of comparative captivity. Thus the common tortoise of Europe, *Testudo græca*, usually selects the lettuce, the dandelion, the milk-thistle, and other plants of this description: a specimen of *T. pardalis*, however, fed almost exclusively on grass, which it plucked by a sidelong movement of the head. On approaching a plant, the head is usually stretched out slowly towards it, and its fitness for food evidently determined by the smell. The mouth is then slowly opened, the head turned on one side, so as to take as large a portion of the leaf as possible into the mouth, which is then closed, and the morsel cut off between the horny edges of the upper and lower jaws, as if with shears.

This is repeated with greater or less rapidity, until a considerable portion has been taken, and the food is at once swallowed without any attempt at mastication. As the œsophagus is large, and very distensible, large pieces of the stalk are often swallowed whole, without inconvenience. A specimen of *T. areolata*, which I kept some years since, and which was so tame as to eat readily from my hand, would swallow in this way a piece of the stalk of cabbage, or a small piece of hard pear, nearly as long as its body, without biting it sufficiently to separate it into smaller pieces, or even to render it flexible; so that the posterior part of the stomach must have been forced backwards by it almost to the extent of the abdominal cavity, and this without producing the slightest apparent disturbance to the animal.

From these exclusively vegetable feeders we pass towards the fresh-water tortoises, which live on animal substances only, by the intermediate form of the Box Tortoises, which live on food of a mixed kind; of these, the common American species *Terrapene clausa* devours not only various vegetable matters, but snails, worms, and other small animals. The European species of the same genus, *T. europæa*, approaches more nearly in form and habit to the fresh-water tortoises, and may in fact be considered as the common fresh-water tortoise of Europe. Its common food consists of fish and other aquatic animals; and as it always leaves the air-bag of the fish which it eats, the number of these which float on the surface of a lake or pond is considered as an indication of the comparative number of tortoises which inhabit it. Yet even this species, so carnivorous in its general habits, is not necessarily confined to animal food; for we are told that in some parts of Europe, where it is eaten by the inhabitants, it is not only *fed* but *fattened* upon grains.

Such, however, is far from being the case with the more typical fresh-water species, including the remainder of the family *Emydidæ*, and the whole of the *Chelydidæ* and *Trionychidæ*. These live exclusively on animal food of different kinds, such as fish, batrachian animals, the young of water birds, aquatic mollusca and insects. They are generally furnished with long sharp claws, by which they tear their prey to pieces. These are particularly long in some of the American species, as *Emys irrigata, ornata, decussata*, in which they not unfrequently attain an inch or more in length. When the *Emydes* seize their prey, if it be motionless or nearly so, they usually creep towards it with great caution, stretching the neck slowly till the mouth is within a short distance, and then seizing it by a sudden snapping motion of the jaws. I had an individual specimen of *Emys decussata* in my possession, which, whenever it was about to take food, stretched out the two anterior feet, one on each side of the head, and with the palms outwards. These were held in the same position for some moments, but agitated with a vibratory motion, after which the head was suddenly darted forwards on the prey. This curious manœuvre was repeated as often as a morsel of meat was held near him; but I never observed a similar habit in any other tortoise of this or any other species. In pursuing their prey however, when swimming, a greater degree of rapidity is of course necessary. I have seen a common fresh-water tortoise, *Emys lutaria*, pursue a frog in a large vessel of water with considerable rapidity, seize it by the belly, and tear it to pieces in a very short space of time. These animals may be very easily kept during the summer in a small pond or reservoir of water, by feeding them with pieces of raw lean beef, if living frogs, fish, or worms cannot be readily obtained. They will also feed on the intestines of fowls, and on almost any other animal substance.

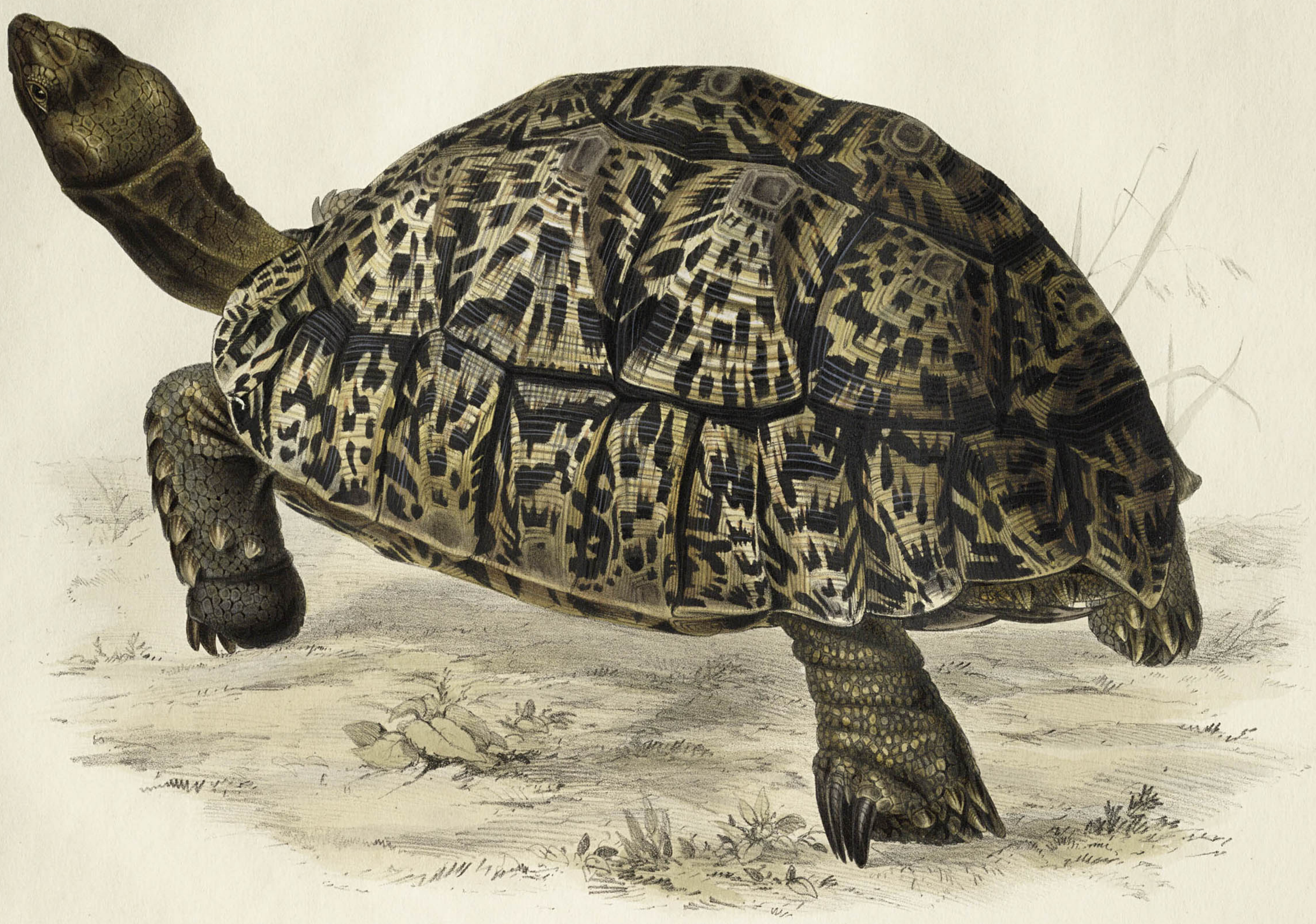
The force and tenacity with which the carnivorous Testudinata seize and hold their food is very great. They may in fact, in some cases, be easily caught by allowing them to seize a piece of meat attached to a string, and then drawing it quickly out of the water.

The habits of *Chelydra serpentina* are those of extreme voracity. Endowed with great strength, and astonishing rapidity and force in the movements of its limbs and neck, it is enabled to pursue, seize and tear in pieces, fish of no inconsiderable size, and the young of aquatic birds which swim on the surface of the lakes in which it abounds.

It is said also to conceal itself in the mud, by which means it escapes the observation of the animals which it makes its prey, till they come within its reach. In this circumstance, as well as in the sudden snapping motion by which the species just mentioned seizes its food, the whole of the *Trionychidæ* probably resemble it. The flatness of the body and the soft flexible structure of its broad coriaceous margin peculiarly adapt them for concealment in the

muddy bottoms of rivers; and the neck is as extensile and as capable of being rapidly protruded as in the *Chelydra*. Colonel Sykes informs me that in several specimens of the *Trionychidæ* taken from the Ganges, which he opened, the stomachs were found filled with Uniones, the shells of which had been broken, previously to their being swallowed, into angular fragments which still adhered to the mantle, the bodies of the mollusca being still whole. This would appear to indicate that they seek their prey principally amongst the mud at the bottom of rivers, a situation in which their form enables them so readily and so completely to conceal themselves.

From the carnivorous fresh-water tortoises which have just been mentioned we advance at once and without the intervention of any genus of intermediate habits, to the *Cheloniadæ*, which, as far as we yet know, are generally though not exclusively vegetable feeders. We have seen in the passage from the land to the fresh-water groups, two distinct and well-marked gradations towards the animal aliment of the typical fluviatile form; of which the habits of *Terrapene clausa* constitute the first step, and a further advance is seen in the European species of the same genus. But in the transition from the fluviatile to the marine forms, no connecting link, as far as regards food, has hitherto been discovered. In the structure, at least, of the external covering, the Coriaceous Turtle (*Sphargis mercurialis*), following the *Trionychidæ*, may indicate a passage from the fresh-water to the marine group, and there is a possibility that in this species we may also ascertain those omnivorous habits, which would fill that hiatus in the nature of their food, which, according to our present information, still exists between the families in question;—for I have hitherto failed in finding any account of the food of the Coriaceous Turtle in any author. The other marine turtles feed very principally on marine and maritime plants, especially the Turtle Grass as it is commonly called. On the shores of those oceanic islands in which these animals breed, and where they are found in the greatest numbers, this vegetable constitutes their principal nourishment. It is however also stated upon good authority, that the Loggerhead Turtle especially (*Chelonia Caretta*) feeds also on molluscous animals: and in default of their favourite vegetable food, there appears no doubt that all the marine turtles may be sustained with animal nourishment. The stories



TESTUDO PARDALIS, *Bell.*

J. D. C. Sowerby del. E. Lear lithog. — Printed by C. Hullmandel.

TESTUDO PARDALIS. *Bell.*

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

TESTUDO PARDALIS. *Bell.*

Testâ flavâ, nigro adspersâ; scutis sulcatis, [illegible] marginem superiorem positis; scuto nuchali nullo; femore utroque scutis binis, magnis, conicis, armato.

Testudo pardalis. Bell, Zool. Journ. iii. [illegible] xxi. p. [illegible].—Gray, Syn. Rept. p. 12.

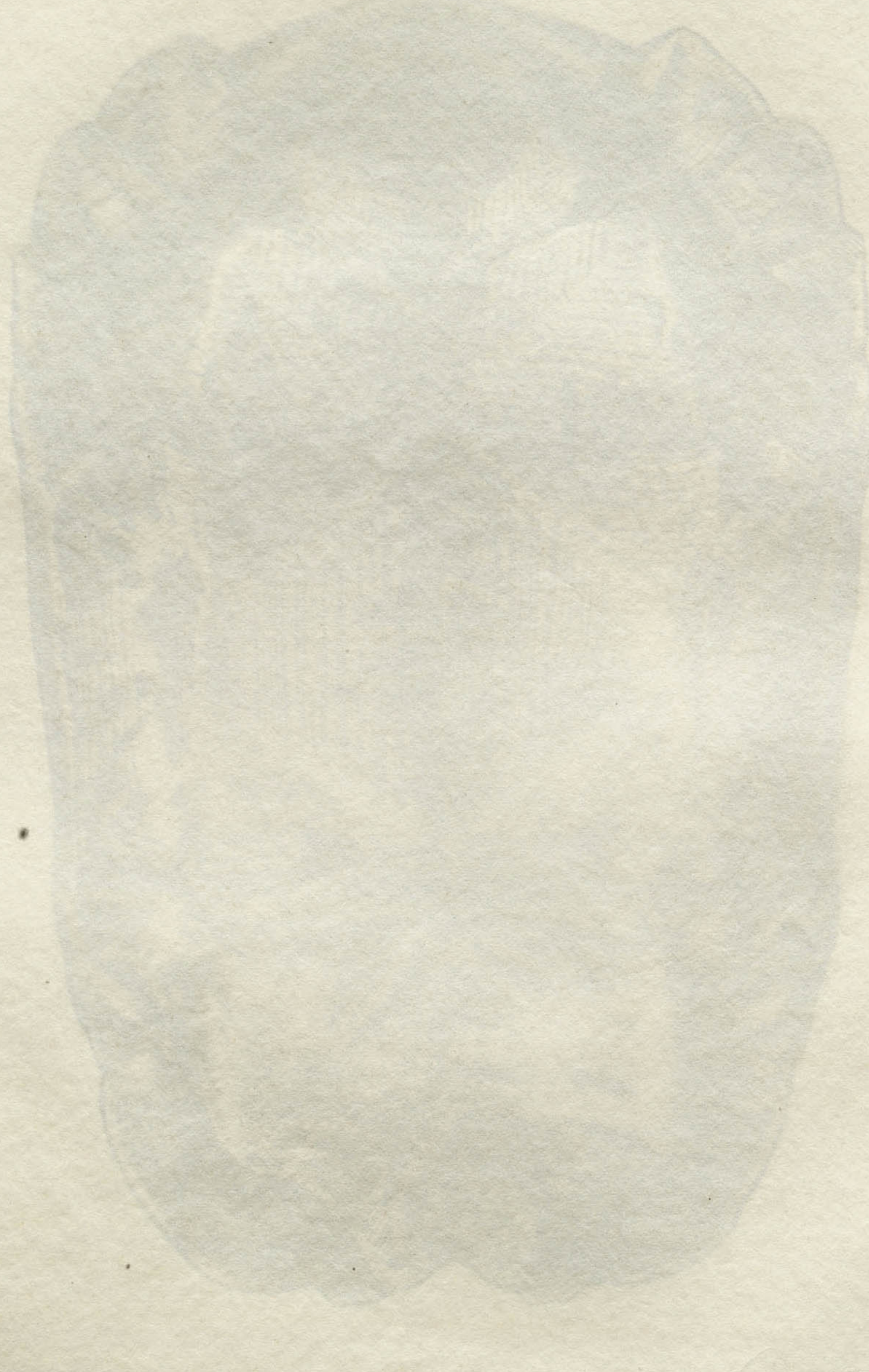
Junior. Gray, l. c. tab. [illegible].

? Pullus. Sebæ Thes. i. tab. lxxix. fig. [illegible]. *Testudo elegans.* Shaw, Gen. Zool. iii. p. [illegible].

Habitat in Africa australi.

Mus. nostr. Jun. in Mus. Brit.

Descriptio. *Caput* fuscum, [illegible] oblongum, squamis [illegible] rotundatis tectum, quarum superiores multò majores. *Maxillæ* denticulatæ. *Irides* fuscæ. *Collum* longissimum, flexile, fuscum, posticè flavescens, squamis minutis undique tectum. *Pedes antici* fusci, squamis magnis, lanceolatis, imbricatis, flavescentibus, defensi. *Ungues* longi, [illegible]. *Pedes postici* fusci, squamis lutescentibus, quarum quædam planæ, hexagonæ, aliæ, ad calcem posita, lanceolatæ, gibbosæ. *Femora* squamis similibus defensa, quarum utrinque duæ magnæ, [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]



TESTUDO PARDALIS, *Bell.*

Testâ flavâ, nigro aspersâ; scutis sulcatis, scutorum costalium areolis prope marginem superiorem positis; scuto nuchali nullo; femore utrinque scutis binis, magnis, conicis, armato.

Testudo pardalis. Bell, Zool. Journ. III. tab. sup. XXV. p. 421.—Gray, Syn. Rept. p. 12.

Junior. Gray, l. c. tab. iii.

? Pullus. Sebæ Thes. I. tab. lxxix. fig. 3. *Testudo elegans.* Shaw, Gen. Zool. III. p. 49.

Habitat in Africâ australi.

Mus. nostr. Jun. in Mus. Brit.

DESCRIPTIO. *Caput* fuscum, flavo obscurè nebulosum, elongatum, squamis plurimis rotundatis tectum, quarum superiores multò majores. *Maxillæ* denticulatæ. *Irides* fuscæ. *Collum* longissimum, flexile, fuscum, posticè flavescens, squamis minutis undiquè tectum. *Pedes antici* fusci, squamis magnis, lanceolatis, imbricatis, flavescentibus, defensi. *Ungues* longi, angusti. *Pedes postici* fusci, squamis lutescentibus, quarum quædam planæ, hexagonæ; aliæ, ad calces positæ, lanceolatæ, gibbosæ. *Femora* squamis similibus defensa, quarum utrinquè duæ magnæ, fortissimæ, conicæ. *Ungues postici* angusti, longissimi. *Cauda* brevis, conica, tuberculata. *Testa* ovata, supra femora expansa, altè fornicata. *Scuta* sulcata, flava, maculis numerosis irregularibus, nigris, radiatim aspersa; areolis sordidè flavis: *vertebralia* gibba, areolis centralibus; primum pentagonum, latum; secundum hexagonum, anticè angustius; tertium transversè hexagonum; quartum hexagonum, posticè angustius; quintum subhexagonum, gibbosum, posticè dilatatum: *costalia* plana, lata, ferè quadrata, areolis prope marginem superiorem positis: *marginalia* lata; anteriora expansa, porrecta; lateralia quadrata, infrà rotundata; posteriora prominentia. *Scutum nuchale* nullum; *caudale* latè pentagonum, gibbosum incurvum. *Sternum* flavum, maculis nigris radiatis, planum, anticè leviter sinuatum emarginatum, angustum; *scuta gularia* porrecta, angusta: margo posterior profundè lunato-emarginatus.

TESTUDO PARDALIS.

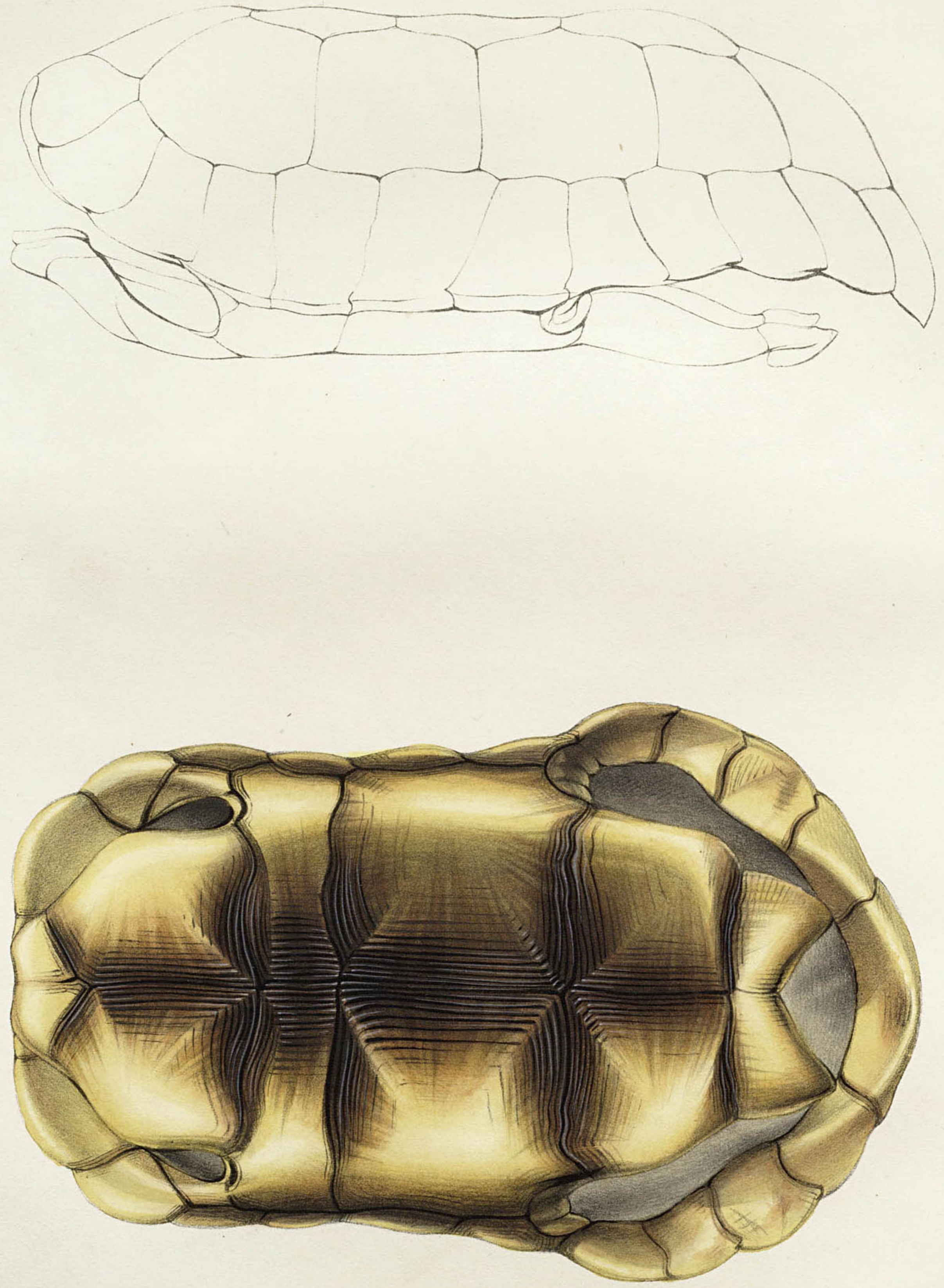
Testæ osseæ mensura.

	ped.	unc.	lin.
Longitudo dorsi	1	5	0
Latitudo ejusdem	0	11	0
Altitudo	0	8	5
Longitudo sterni	1	3	0

It is surprising that a species of Tortoise at once so beautiful and of so large a size, inhabiting, too, a region so much frequented by travellers, should have so long remained unknown to naturalists. The first specimen noticed was one which I kept alive for about a year and a half; it had in the summer months the range of a small orchard, where it fed heartily on grass, which it appeared to prefer to any other food, and which it plucked with a sidelong movement of the head, exactly similar to that of a goose. The neck was so remarkably long and extensile, that the head could be easily raised much above the level of the top of the back, and thus the animal was enabled to look round on all sides, merely by turning the head; a peculiarity which I have never observed in any other species. After its death I opened it, and found it filled with an immense number of eggs, of all sizes from that of a pin's head to that of a pigeon's egg. There was no appearance of shell even on the largest, and they were probably not a third of their full size. I believe there could not be less than two hundred in all.

This is the largest known species of land Tortoise, excepting *Testudo indica*, which it very much resembles in general form, and even in the details of the plates. Besides the great difference in the colour, however, the areolæ of the costal plates in the present species are placed close to the upper margin, whilst in *T. indica* they are central.

I am inclined to believe that Seba's figure, referred to in the list of synonyms, and copied by Shaw under the name of *Testudo elegans*, may be the very young of this species.



TESTUDO TABULATA.

½ long: nat.

J. D. C. Sowerby del. E. Lear, lithog. Printed by C. Hullmandel.

TESTUDO TABULATA

J.D.C. Sowerby del: E. Lear, lithog.

TESTUDO TABULATA.

½ long. nat:

Printed by C. Hullmandel.

TESTUDO TABULATA. *Wallbaum.*

[illegible]

Testudo tabulata Wallbaum. [illegible]

[illegible] Brown, Hist. Jam. [illegible]

[illegible]

T. Gopher. [illegible]

Hab. [illegible]

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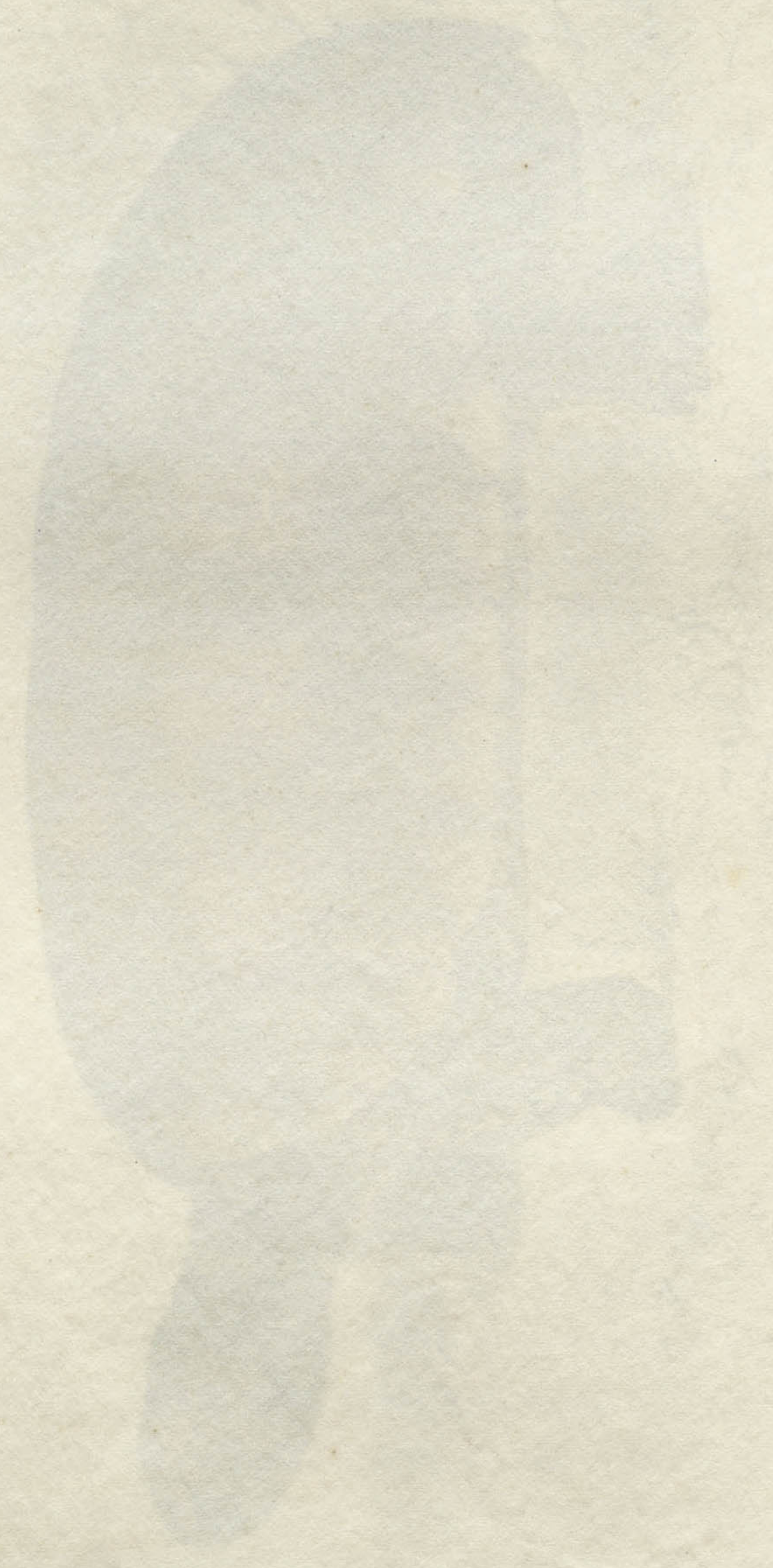


TESTUDO TABULATA, *Wallbaum.*

Pedibus olivaceis, anticè squamis luteis tectâ; testâ oblongâ, depressâ, scutis sulcatis fuscis, areolis flavis; scuto nuchali nullo.

Testudo tabulata. Wallbaum.—Schœpff, tab. xii. xiii. xiv. p. 56.—Shaw, Gen. Zool. III. t. viii. p. 41.—Gray, Syn. Rept. p. 10.—Fitzing. Amph.
Hicatee. Brown, Hist. Jam. n. 5.
T. sulcata. Shaw, Mill. Cim. Phys. xxvi. ——Gen. Zool. III. 39?
T. tessellata. Schneid.—Merr. Amph. p. 31.
T. Polyphemus. Daud. Rept. II. p. 256.—Bonap. Sp. Test. Amer. Bor. et Eur.—Say, Journ. Ac. Phil. IV. p. 204. 207. sp. 1.—Gray, Syn. Rept. p. 11.
T. Carolina. Leconte, Ann. N. York. III. 97. sp. 1.
Gopher. Bart. Trav.—*La tortue Gopher.* Bosc, N. Dict. d'Hist. Nat.
T. Hercules. Spix, Rept. Braz. tab. xiv. p. 20.—Gray, Syn. Rept. p. 9.
T. Cagado. Spix, t. xvii. Testâ nigrâ maculis paucis luteis sparsis.
Junior, Sebæ Thes. tab. I. lxxx. fig. 2.—Schœpff, tab. xiv. p. 62.—*Testudo sculpta.* Spix, l. c. tab. xiv.
Pullus. *Testudo denticulata.* Linn?—Schœpff, tab. xxviii. fig. I. p. 119.

Habitat in Americâ.
Mus. nostr., Mus. Brit. &c.

Descriptio. *Caput* oblongum, subtrigonum, suprà scutellatum, olivaceum. *Maxillæ* denticulatæ, olivaceæ, flavo marginatæ. *Collum* breviusculum, fusco-olivaceum, squamis minutis rotundis omninò tectum. *Pedes antici* olivacei, squamis magnis, triangularibus, imbricatis, luteis, anticè tecti. *Ungues* lati, plani, rotundati, flavescentes. *Pedes postici* fusco-olivacei. *Femora* et *plantæ* squamis magnis, luteis, defensæ. *Cauda* brevissima, apice unguiculata. *Testa* oblonga, depressa, posticè lata, gibbosa, margine integra, lateribus rectis, subparallelis. *Scuta* omnia plana,

sulcata, medio flava, fusco marginata: *vertebralia* planiora, quorum primum pentagonum, latum, gibbosum; secundum et tertium transversè hexagona; quartum hexagonum, posticè angustius et productum; quintum reliquis latius, gibbosum, ad marginem posteriorem rotundatum: *costalia* plana, areolis centralibus; primum trapezium; secundum et tertium pentagona, angulo superiori obtuso; quartum subquadratum: *marginalia* ferè integra; primum horizontale; secundum et tertium obliquè prominentia; quatuor sequentia quadrata, subperpendicularia; reliqua subresupinata. *Scutum nuchale* nullum: *caudale* altum, latum, gibbosum, apice incurvo. *Sternum* latum, anticè et posticè angustius. *Scuta jugalia* parva, prominentia, subbidentata; *humeralia* subrectangula; *pectoralia* trigona, angustissima; *abdominalia* quadrata, rectangula, maxima; *femoralia* crassa, rectangula; *analia* angulata, prominentia, emarginationem triangularem formantia.

Testæ osseæ mensura.

	ped.	in.	lin.
Longitudo dorsi	1	4	0
Latitudo ejusdem	0	10	0
Altitudo	0	6	5
Sterni longitudo	1	0	0

The great similarity which exists between the only two known species of land Tortoise inhabiting the continent of America, namely, the present species and *T. carbonaria*, and the remarkable differences which characterize the former in the young, the adult, and the aged state, have occasioned the greatest possible confusion in the synonymy. Even up to the present time, many of the errors of former naturalists remain uncorrected; and it has not been without much care and hesitation that I have at length determined upon the list of synonyms prefixed to this description. I have, however, been most careful to investigate all the authorities within my reach, and have given none upon which any doubt remained in my own mind. It is only by the collation of many specimens of different ages that we can possibly be satisfied of the identity of *Testudo denticulata* of Schœpff, which is the animal just excluded from the egg,—of *T. sculpta* of Spix, which is its young state, not yet half grown,—

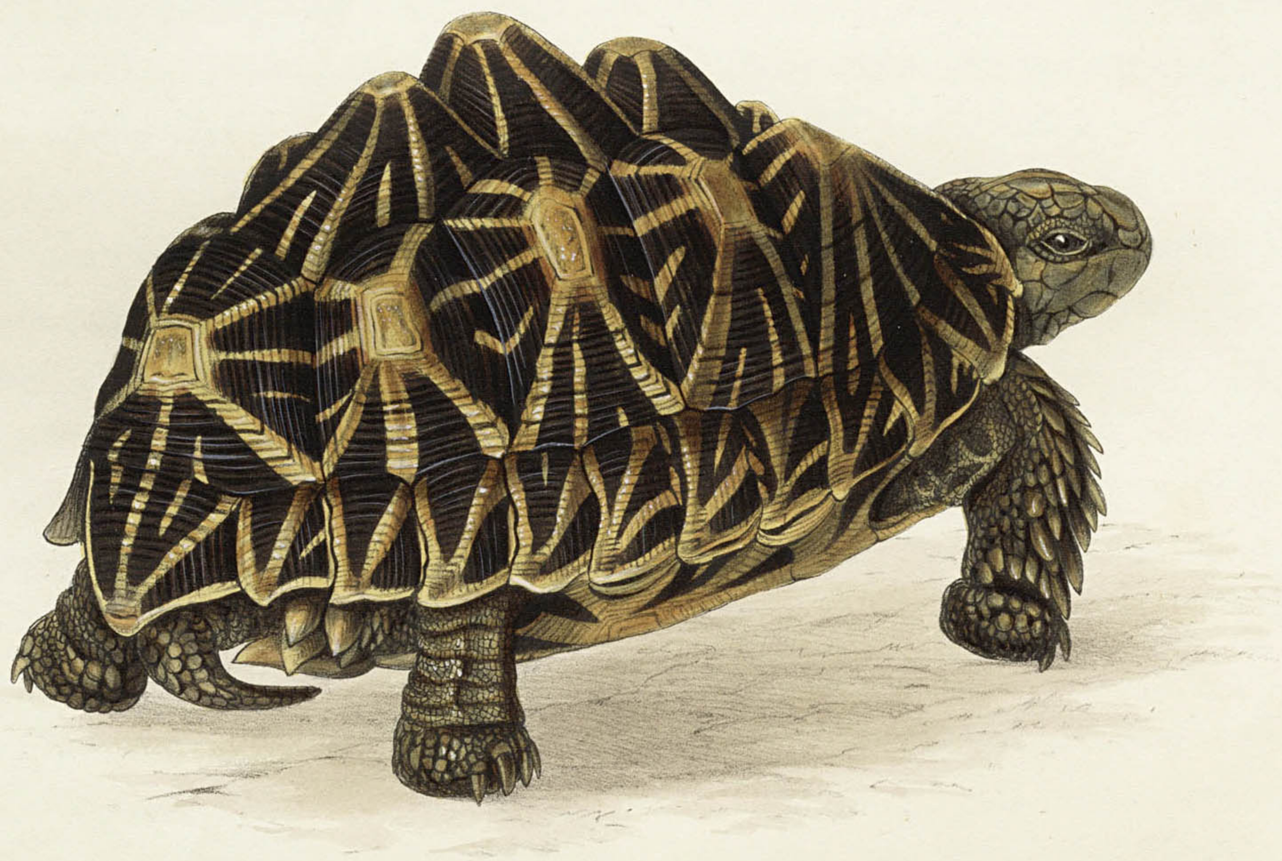
of *T. tabulata* of Wallbaum and of Schœpff, which is the adult animal,—and of *T. Hercules* of Spix, and *T. Polyphemus* of Daudin and Gray, in which the shell has become more extended posteriorly, and the plates smoothed by age. The examination of the animal in either of these stages by its description in any other, would necessarily lead to this multiplication of species; but the possession of many specimens of all ages has enabled me to trace the gradual changes which the animal undergoes, and to ascertain their absolute identity. Mr. Gray has indeed followed Daudin in considering the *Gopher* of Bartram as a distinct species; but I have been assured by the Prince of Musignano, who has had great opportunities of examining that Tortoise in its native country, that it is certainly the same; and he has adopted, for the present species, the specific name *Polyphemus* in his catalogue of the Testudinata of North America and of Europe, appended to his "Osservazioni sulla seconda edizione del Regno Animale del Barone Cuvier," in which he gives the name *tabulata* as a synonym.

Notwithstanding the authority of Mr. Gray to the contrary, I cannot help believing that the long-disputed *Testudo sulcata* of Shaw, figured by Miller in the Cimelia Physica, may be this species. In this opinion I am supported by the habitat assigned to it by Shaw, who says, "This species is said to be a native of the West Indies, and perhaps may be the *Hicatee* of Brown, slightly described in his History of Jamaica." And he concludes by this observation; "Upon the whole, I cannot avoid entertaining a suspicion that this Tortoise may be in reality the same as *T. tabulata*." The general appearance of the shell as well as of the head, bears a very great resemblance to the present animal; and the errors in the drawing, supposing this opinion to be correct, are not greater than occur in many other instances in similar works.

On the other hand it appears from the supplementary portion of Mr. Gray's Synopsis, that he has seen, in the museum of Frankfort, two specimens of a tortoise, which he agrees with Dr. Ruppell in considering "as the long-lost *T. sulcata* of Shaw." These specimens were brought from Abyssinia by Dr. Ruppell. May they not possibly be a variety of *T. pardalis*? As I have not had the advantage of a personal inspection of the specimens, I feel unwilling to be more decided on a point involved in such doubt and obscurity.

This Tortoise is found in the southern States of America, in the whole of tropical America, and in the larger West India islands. It appears that it is not found north of the river Savannah. It is carried to market and sold as food in Florida and Georgia. Those which I have kept have fed on grass, and on dandelions and lettuces, and drank freely. The account which Bartram gives of the habitations of these tortoises, in his Travels in the southern parts of North America, is exceedingly curious, though, like most of his wonderful stories, it is tinctured by an amusing credulity which has rendered him easily imposed upon. "The dens or caverns dug in the sand hills by the great land tortoise, called here Gopher, present a very singular appearance. These vast caves are their castles and diurnal retreats, *from whence they issue forth in the night in search of prey.* The little hillocks of fresh earth, thrown up in great numbers in the night, have also a curious appearance." At another part of his journal he says, "Observed, as we passed over the sand hills, the dens of the great land tortoise, called Gopher. The first signs of this animal's existence as we travel southerly, are immediately after we cross the Savannah river. It is to be seen only on the high dry sand hills, in which they form great and deep dens, casting out incredible quantities of earth; they are esteemed excellent food." It is unnecessary to say that the little flourish of the worthy traveller, about their issuing from their castles in the night time in search of prey, is a simple fiction; for not only are all the land tortoises vegetable feeders, but strictly diurnal animals.

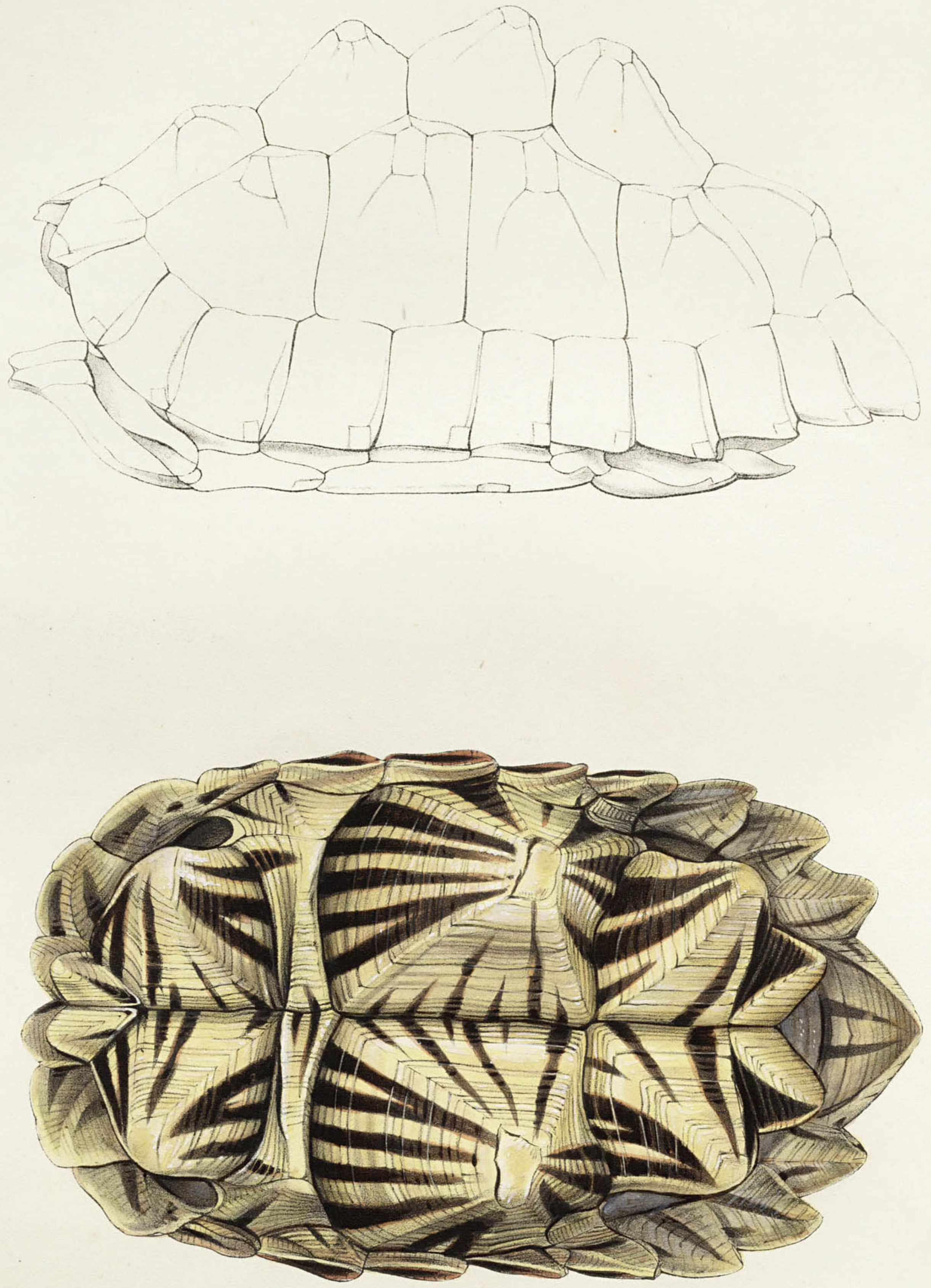
The young animal differs from the older in the brighter colour, the more distinct sculpture, and the rounded oval form of the shell. The eggs are of a spherical shape, very slightly flattened, and about two inches in diameter. The egg shell is thick, and of a friable texture.



TESTUDO ACTINODES. *Bell.*

7/10 long: nat:

J. D. C. Sowerby del: E. Lear lithog. *Printed by C. Hullmandel.*



TESTUDO ACTINODES. *Bell.*

7/10 Nat. Size.

J. D. C. Sowerby del. E. Lear, lithog. | Printed by C. Hullmandel.

TESTUDO ACTINODES, *Bell.*

Testâ oblongo-ovatâ, elongatâ; scutis elevatis, sulcatis, nigris, luteo radiatis; scuto nuchali nullo.

Sebæ Thes. I. t. lxxx. fig. 3.
Testudo geometrica. Lacép. Quad. Ovip. I. p. 155. t. ix.
T. geometrica, var. Daud. Rept. II. p. 265.
T. actinodes. Bell, Zool. Journ. III. p. 419. tab. supp. xxiii.
Junior. *T. elegans.* Schœpff, Hist. Test. t. xxv. p. 111.—Daud. Rept. II. t. xxv. fig. 2. p. 266.
T. stellata. Schweig. Prod. sp. 13?—Gray, Syn. p. 12. t. iii.

Habitat in Indiâ orientali,—in insulâ Madagascar, &c.
Mus. nostr.

Descriptio. *Caput* obtusum, fusco et flavo variegatum, scutatum. *Mandibulæ* denticulatæ. *Oculi* fusci. *Collum* fuscum, squamis minutis tectum. *Pedes* fusci; *anteriores* squamis numerosis, magnis, imbricatis, lanceolatis, luteis, anticè defensi; *posteriores* squamis parvis, rotundatis, gibbosis, tecti. *Femora* utrinque squamis tribus vel quatuor magnis, conicis, luteo-fuscis. *Cauda* mediocris, squamata. *Testa* oblongo-ovata, elevata, margine anticè emarginato, posticè dentato. *Scuta dorsalia* concentricè sulcata, convexa, nigra, radiis luteis, marginem versus latioribus, areolis magnis, elevatiusculis; *vertebralia* elevata, subconica, truncata; primum pentagonum; secundum hexagonum, anticè angustius; tertium transversè hexagonum; quartum hexagonum, posticè angustatum; quintum subhexagonum, anticè angustius, posticè expansum, margine rotundato: *costalia* gibbosa, areolis prope marginem superiorem positis, planis, vel paululò elevatis; primum trapezoideum; secundum et tertium elongato-pentagona; quartum subquadratum: *marginalia* anteriora porrecta, angulata, emarginationem triangularem formantia; secundum et tertium declivia; lateralia verticalia, margine plano, integro; paria tria posteriora prominentia, angulata. *Scutum nuchale* nullum: *caudale* magnum, latum, pentagonum, perpendiculare vel

subprominens. *Sternum* anticè subdentatum, posticè trigono- vel lunato-emarginatum: *scuta sterni* flavo nigroque radiata, subsulcata: *gularia* parva, trigona: *humeralia* irregulariter pentagona: *pectoralia* anticè sinuata: *abdominalia* magna, quadrata: *femoralia* quadrata: *analia* rhomboidea, porrecta: *axillaria* exigua: *inguinalia* parva, triangularia.

Testæ osseæ mensura.

	unc.	lin.
Dorsi longitudo	8	6
Latitudo ejusdem	5	3
Altitudo	5	0
Longitudo sterni	7	4

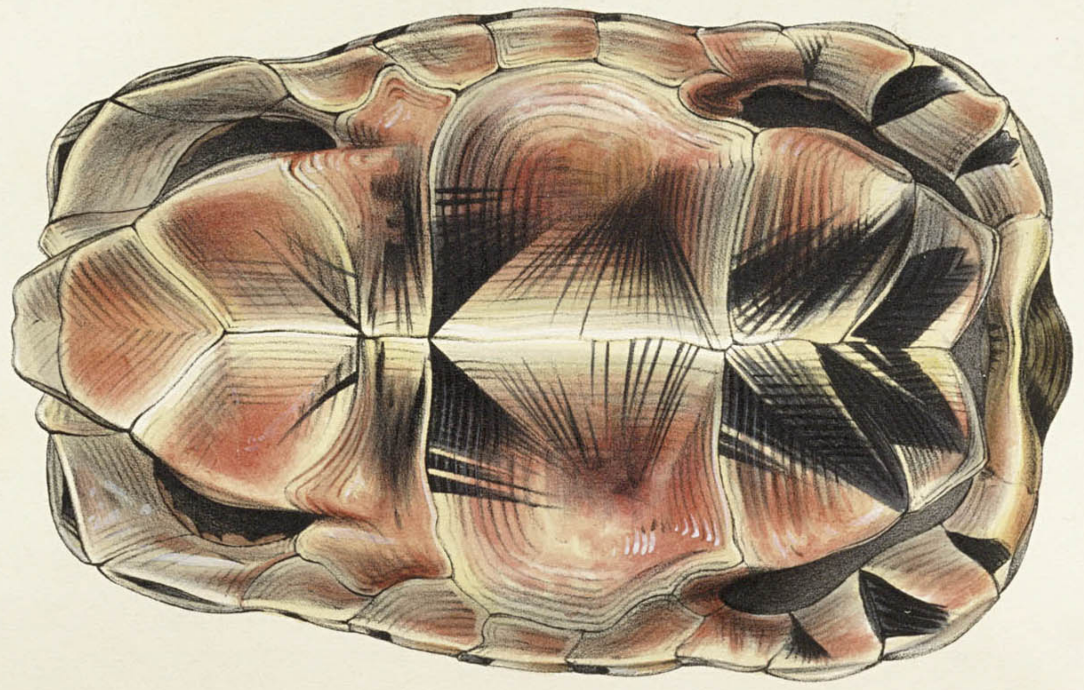
Although specimens of this species have long existed in several of the Continental museums, as is proved by the figures of Seba and of Lacépède, as well as the descriptions of the latter author and of Daudin, it had, until of late, been universally confounded with *Testudo geometrica*. The description of Lacépède, purporting to refer to the latter species, is, in fact, as well as his figure, taken from a specimen of *T. actinodes*, as he assigns to it only twenty-three marginal plates; a character which belongs essentially to the present species, whereas *T. geometrica* has always twenty-four. It is also the first variety of *geometrica* of Daudin. In the very young state it has received from Schœpff the name of *T. elegans*, and that of *T. stellata* from Schweigger; and Mr. Gray has adopted the latter name. In the adult state it was first described by myself in the Zoological Journal, and figured in the Supplementary Plates of that work.

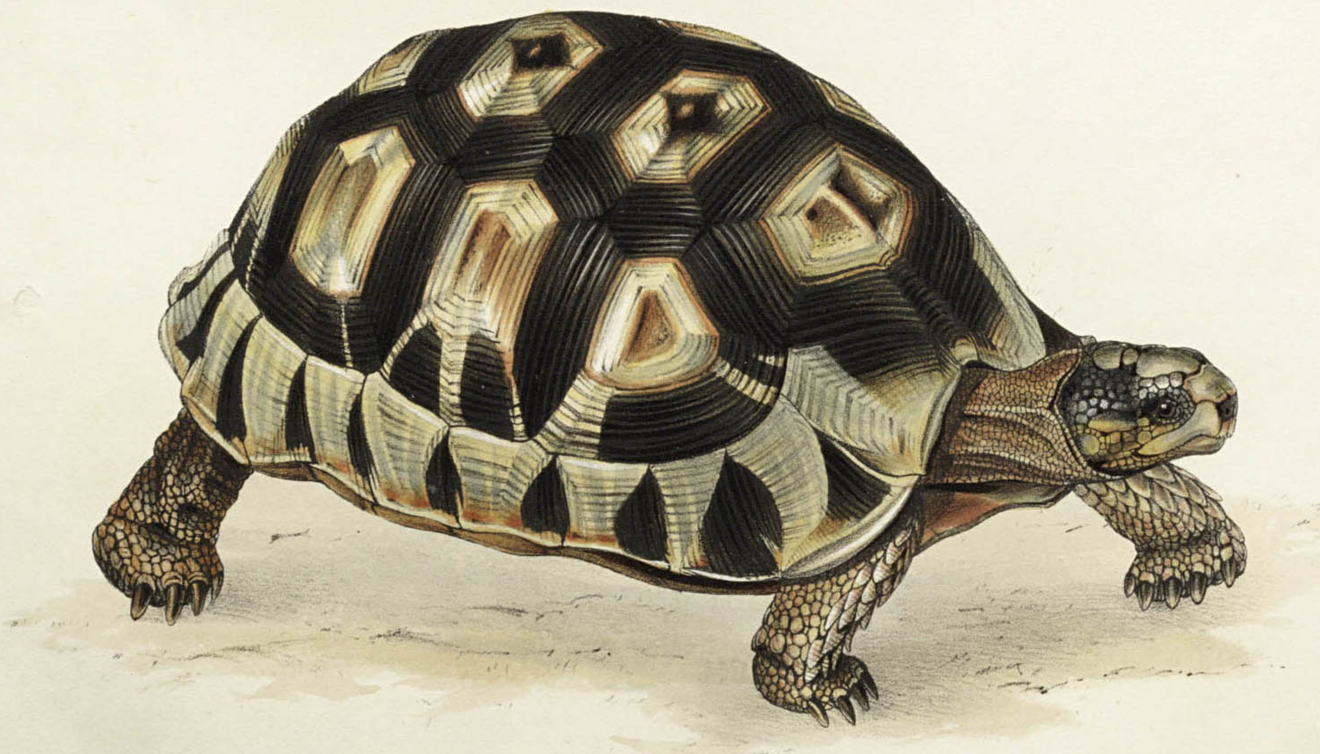
In its general appearance and the character of its markings, it certainly bears a great resemblance to the species with which it has been so often confounded; there are, however, many constant and strongly marked differences. The head is very similar both in form and colour, and so are the neck and limbs; but the anterior feet, in *T. actinodes*, are furnished with a greater number of those imbricated scales, which protect the anterior part of them in both species; the tail also is somewhat longer, and the thighs are furnished with about three or four

strong conical scales on each side. The general form of the shell is much less globose: the margin is not in the least degree revolute in any part; in *geometrica* it is so throughout the whole circumference: the nuchal plate, which is always present in the other species, is here invariably wanting: the posterior margin is much more deeply indented, and the caudal plate, instead of being incurved under the marginal outline of the shell, as in *geometrica*, is either perpendicular, or inclined backwards. The areolæ, as may be concluded from the comparative size of the two animals, are much larger in *actinodes*, and, instead of being depressed, are either quite plane or slightly elevated. There is also considerable diversity in the character of the yellow radiations of the plates. In *geometrica* they are linear; in *actinodes* they become much wider towards the circumference. The ground colour of the sternum in the present species is a light yellow, with very distinct black radiations, which also widen towards the circumference, as the yellow rays do on the dorsal plates. In *geometrica* the sternum is clouded with yellow and light brown, and the darker radiations are only here and there observable towards the margin of the plates.

In young specimens the colours are brighter, the markings more distinct, and the plates, instead of being much elevated, as in the adult, are almost flat.

I have had several individuals of this species living, but have not succeeded in keeping them alive over the winter, notwithstanding they had fed freely during the warm weather. The egg is oval, and about the size of a pigeon's.





TESTUDO ANGULATA.

J D C Sowerby del. E Lear lithog. Printed by C. Hullmandel.

TESTUDO ANGULATA, *Dumeril.*

Testâ oblongâ, ventricosâ ; scuto gulari unico porrecto.

Knorr, Del. Nat. iii. t. lii. p. 2.
Howitt, Liv. Mus. t.—
Testudo angulata. Dumeril, MS. in Mus. Par.—Schweig. Prod. sp. 7.
Testudo Bellii. Gray, Spic. Zool. t. iii. p. 4.
Chersina angulata. Gray, Syn. Rept. t. ii. p. 5.

Habitat in Africâ australi et in Insulâ Madagascar.
Mus. nostr.

Descriptio. *Caput* nigrum, flavo maculatum. *Mandibulæ* flavæ, denticulatæ. *Collum* fuscum, subtùs pallidius, squamis minutis æqualibus tectum. *Pedes anteriores* fusci, squamis imbricatis anticè defensi. *Ungues* acuti, lanceolati. *Pedes posteriores* fusci, squamati. *Cauda* mediocris. *Testa* oblonga, ovata, ventricosa, fornicata, anticè triangulariter emarginata, supra humeros et femora expansa. *Scuta dorsalia* omnia concentricè sulcata, margine nigro, disco luteo : *vertebralia* subplana, areolis piceis, depressis ; primum pentagonum, anticè truncatum vel emarginatum, areolâ carinatâ ; secundum et tertium transversè hexagona ; quartum hexagonum, posticè angustius ; quintum hexagonum, anticè productum : *costalia* disco flavo, areolâ piceâ, margine nigro ; primum trapezoideum, margine inferiore rotundato ; secundum et tertium pentagona ; quartum trapezoideum : *marginalia* in partes dimidias obliquè divisa, quarum anterior nigra, posterior major (areolam includens), flava ; primum angulato-prominens ; secundum et tertium declivia, expansa ; quartum ad septimum quadrata, verticalia ; reliqua declivia, margine revoluto. *Scutum nuchale* lineare, anticè flavum : *caudale* latum, gibbosum, incurvum, flavum, plagâ triangulari ad latera, et lineâ centrali, nigris. *Sternum* flavescenti-miniatum (post mortem flavescens), parte mediâ et posteriori plùs minùs nigro umbratâ ; posticè angulato-emarginatum. *Scutum gulare* unicum (quasi scuta bina connata) pentagonum, truncatum, ultra testam superiorem porrectum. *Scuta humeralia* rhomboidea, margine externo rotundato :

axillaria minuta: *pectoralia* ad marginem antico-externum sinuata: *abdominalia* magna, quadrata, ad marginem antico-externum rotundata: *femoralia* trapezoidea: *analia* rhombea, ad marginem testæ superioris ferè attinentia.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	7	2
Latitudo ejusdem	4	5
Longitudo sterni	7	0
Altitudo	2	3

It is not easy to account for the obscurity which so long hung over this species, so common as it is in collections, and so frequently brought alive to this country. It appears that although Dumeril had affixed the present specific name to a specimen in the Paris Museum, it was in Schweigger's Prodromus that it was first described. So little known is this valuable paper, that Mr. Gray published the species as new in the first Number of his Spicilegia, under the name of *Testudo Bellii*.

This tortoise is more pleasing and elegant in its form and colours than most others. The regular arch of the shell, and the correct form and concentric furrowing of the plates, are not less remarkable than the pleasing contrast of the colours, and the perfect regularity of their distribution. The disk of each dorsal plate is yellow, becoming brownish or piceous at the areola, and the circumference a rich deep black. Each of the marginal plates is diagonally divided into yellow and black, the former occupying the larger portion. The sternum, during life, is yellow, clouded with a bright vermilion red, which disappears soon after death; and there are some blackish radiations on each of the sternal plates. In old age, the sulci become obliterated, the markings obscure, and the shell somewhat expanded.

The most remarkable peculiarity of this species however, and which distinguishes it from all others of the terrestrial form, consists in the gular plates being united into one, with a slightly raised median line; so that, strictly speaking, there is but a single gular plate. This is the only exception,

amongst the Testudinidæ or land tortoises, to the rule that the sternal plates are twelve; and Mr. Gray has considered this character as sufficiently important to constitute a distinct genus, to which he has given the appellation *Chersina;* a name already applied by Merrem, though with a different termination, to the genus *Testudo* as it now stands. I cannot see the propriety of separating an individual species from a genus, to the other species of which it is in every important respect closely allied, and assigning to it a distinct generic rank, merely on the ground of so slight a distinction as the union or separation of a pair of scuta. This multiplication of genera, which in such extensive classes as birds or insects may be necessary and useful, is, in the present case, alike uncalled for on the score of convenience, and unauthorized by any claims of natural arrangement.

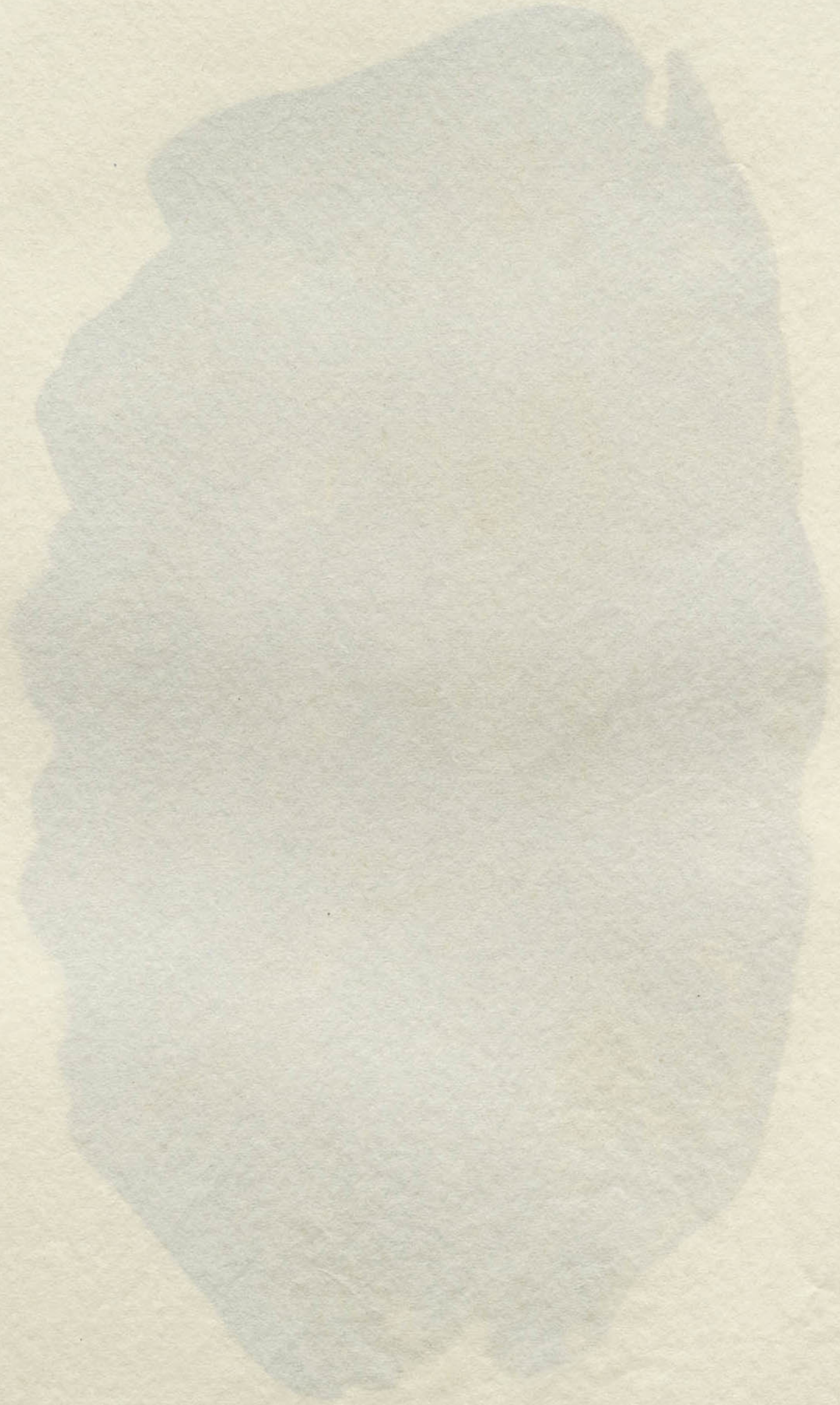
Mr. Gray suggests that "*T. pusilla* Linn. and Daud., and *consequently T. miniata* Lacép., appears to belong to this species, which is sometimes reddish beneath when alive." This is an amusing allusion, as there is no such name as *miniata* applied to a tortoise in Lacépède or in any other writer that I am acquainted with; but Mr. Gray probably means the "Vermillon" of that author. Had he read Lacépède's own description, he would have seen that it agrees fully and solely with *T. areolata,* and that the name "Vermillon" was given to it on account of the red colour of the horny plate over the nose. "Sur le sommet de la tête," says the author, "dont on a comparé la forme à celle d'un perroquet, s'élève une protubérance d'une couleur de vermillon melangé de jaune. C'est de ce dernier caractère que nous avons tiré le nom que nous lui donnons."

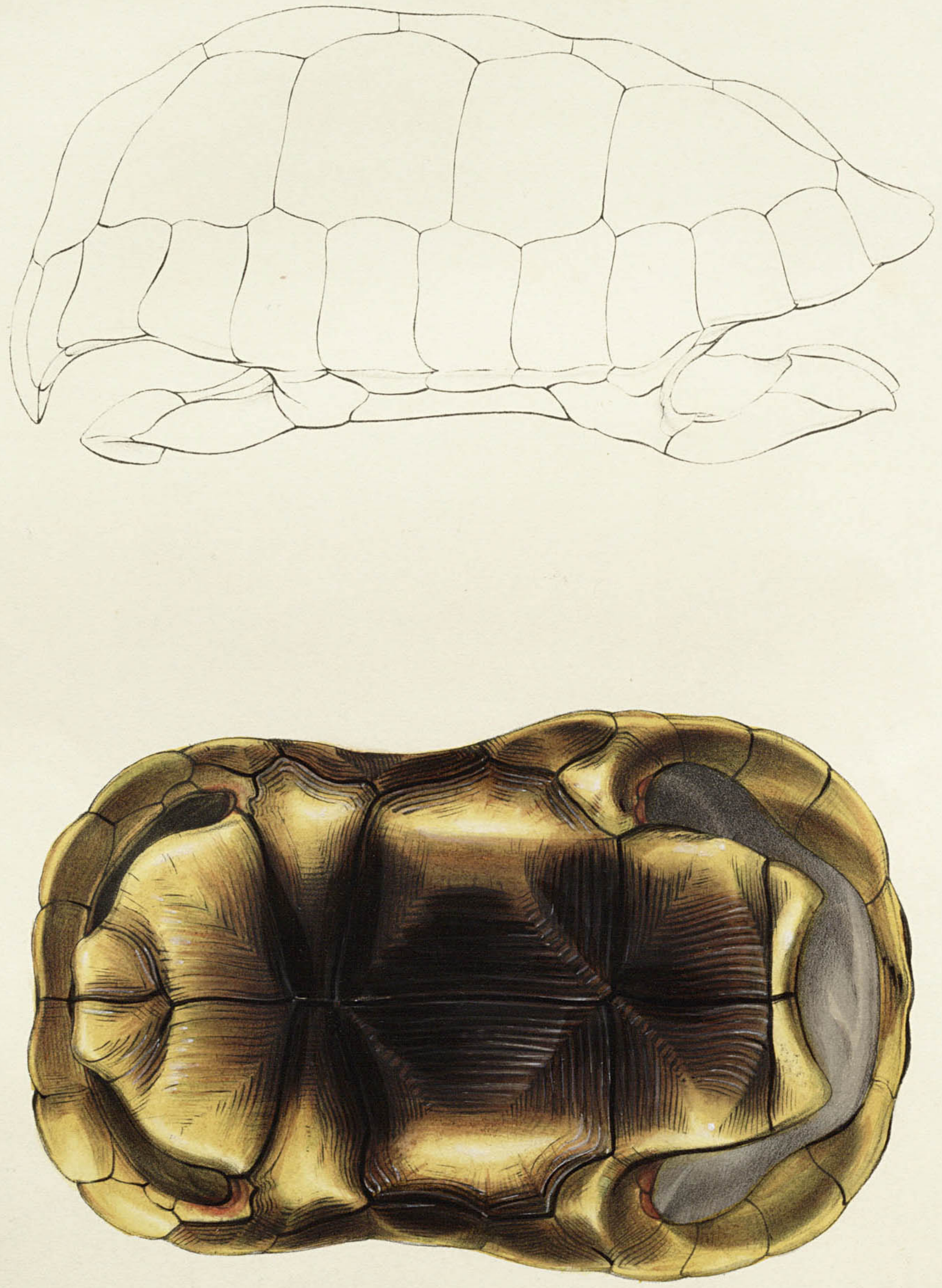
I have received many specimens of this tortoise alive from Madagascar and from the Cape of Good Hope, and have kept one for more than a year, feeding in the summer upon lettuce and other vegetables, and hibernating in a stable under straw.

TESTUDO CARBONARIA. *B.*

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.





TESTUDO CARBONARIA, *Spix.*

½ long: nat:

J. D. C. Sowerby del. E. Lear lithog.

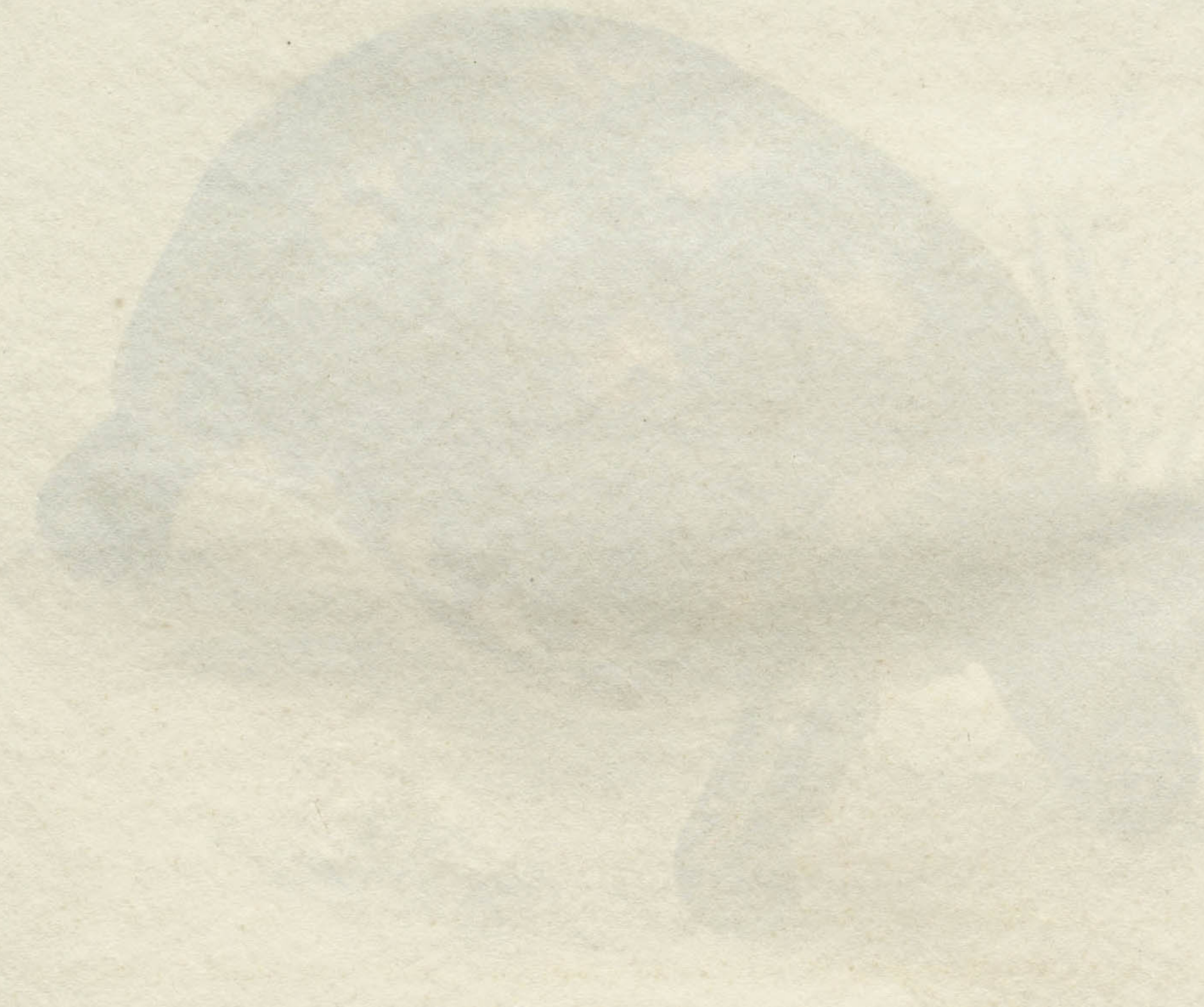
Printed by C. Hullmandel

TESTUDO CARBONARIA, *Spix.*

½ long: nat:

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.



TESTUDO CARBONARIA, *Spix.*

Pedibus anticis nigris, squamis coccineis; testâ oblongâ in medio coarctatâ; scutis sulcatis, nigris, areolis luteis; scuto nuchali nullo. Sterno posticè latissimè emarginato.

Testudo carbonaria. Spix, Rept. Braz. tab. xvi. p. 22.
Testudo tabulata. Daud. Rept. II. 242.—var. Fitzing.
Testudo Hercules junior. Gray, Syn. Rept. p. 9.
β. testâ solidissimâ, scutis elevatis, truncatis.

Habitat in Americâ Australi.
Mus. nostr., Mus. Brit. &c.—β. in Mus. nostr.

Descriptio. *Caput* atque *collum* olivacea, maculis lutescentibus obscurè notata; vertex scutis olivaceis tectus. *Pedes* nigri, squamis imbricatis, coccineis anticè defensi; *ungues* fusci, obtusi. *Cauda* longior, crassa. *Testa* oblonga, fornicata, ad latera coarctata, posticè rotundata. *Scuta* subgibbosa, sulcata, (senectute polita,) nigra, areolis luteis: *vertebralia* plana; primum pentagonum, gibbosum, anticè acutè angulatum; secundum atque tertium plana, transversè hexagona; quartum hexagonum, posticè attenuatum; quintum anticè angustius, medio gibbosum, margine postico rotundato: *costalia* declivia, subconvexa; primum trapezium; secundum et tertium pentagona; quartum subquadratum: *marginalia* anteriora declivia; lateralia quadrata, verticalia; paria tria posteriora declivia. *Scutum nuchale* nullum: *caudale* gibbosum, apice incurvo. *Sternum* fuscum, circum areolas luteum, concavum, anticè truncatum, emarginatum, ad marginem posteriorem latissimè lunato-excavatum. *Scuta sterni* sulcata, sulcis distantibus: *gularia* trigona, anticè unidentata: *humeralia* subquadrata: *axillaria* processum anticum scutorum pectoralium tegentia: *pectoralia* margine integro, et scutis aliis undiquè inclusa: *abdominalia* subquadrata: *inguinalia* anticè rotundata, posticè sinuata: *femoralia* quadrata, rectangula: *analia* quadrilatera, excavata, posticè porrecta, sed a margine testæ superioris distantia.

Testæ osseæ mensura.

	ped.	unc.	lin.
Longitudo dorsi	1	0	5
Latitudo ad scutorum marginalium par quartum	0	7	5
——— sextum	0	6	7
——— nonum	0	9	0
Altitudo testæ	0	5	6
Longitudo sterni	0	10	6

Although the distinctions which exist between this species and *T. tabulata* are such as might strike even an unpractised erpetologist as sufficient at once to point them out as distinct, it was not until Spix examined them both, in every stage, in their native country, that they were properly discriminated; nor indeed had any attempt been offered at showing their distinctive characters, nor even a suggestion to that effect been made, by previous authors. Daudin has, in fact, described a specimen of this species as *T. tabulata;* and Spix himself, to whom the merit of distinguishing them belongs, has much diminished its value, by the total want of discrimination which he has evinced in forming three new species from as many mere varieties of age and colour of *T. tabulata.* I had, it is true, long before separated, in my own cabinet, the specimens of *T. carbonaria* from those of *tabulata;* but this had been the result of the very marked differences which are so obvious in the living animals, rather than from those essential characters in the form of the shell which, though less striking, are so constant as to constitute excellent specific distinctions.

Mr. Gray has applied to the present species the specific name of *Hercules* given by Spix to the aged state of *T. tabulata;* although, if there be one condition of that species more dissimilar than all others from the true *carbonaria,* it is this. The very figure on which Mr. Gray has founded his adoption of Spix's name, contradicts in a most striking manner his own specific character, "lateribus inflexis;" for in the Plate the sides are distinctly convex; whilst in the figure of *carbonaria,* in the same work, the characters are all sufficiently well expressed.

The characters in which the present species differs from *T. tabulata* are

striking and constant. The following parallel will exhibit the most important of them.

In *T. tabulata.*	In *T. carbonaria.*
The general colour of the skin a lightish olive.	The general colour dark olive, approaching in parts to black.
Scales on the legs yellow.	Scales on the legs a deep bright red.
Ground colour of the shell fuscous, in old specimens brownish yellow, with yellow areolæ.	General colour of the shell a rich deep black, with yellow areolæ.
Tail extremely short.	Tail moderately long.
Posterior sternal notch triangular, nearly half as deep as it is broad.	Posterior sternal notch lunate, very broad and shallow, the depth being less than one fifth of the breadth.

In young specimens the shell is not contracted at the sides; but in older ones the middle of the shell is narrower by about an inch than the anterior part, and by nearly two inches and a half than the hinder part. The plates also lose the sulci and become polished by age.

I have a shell of this species exhibiting a very remarkable variation in form, in which the bones are exceedingly thick and heavy, and raised beneath each plate, so as to give a considerable degree of elevation to each dorsal plate; the areolæ are truncated. (See the Plate B.)

The habits of this species resemble those of *T. tabulata;* but it inhabits a more southern latitude, as I believe it is not found in any part of the United States. It is very common in Brazil, Demerara, and the whole of Tropical America, as well as in the island of Jamaica.

The egg is very similar to that of *T. tabulata,* but rather smaller, being an oblate spheroid, of which the greater diameter is 1 inch 9 lines, and the less 1 inch 6 lines.

TESTUDO SIGNATA.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

TESTUDO SIGNATA, *Wallbaum.*

Testâ ovatâ, depressâ; scutis disci subelevatis, luteis, piceo maculatis, areolis depressis; scutis marginalibus posticis dentatis, revolutis; scuto nuchali brevi, quadrato.

Testudo signata. Wallbaum.—Schœpff, tab. xxviii. p. 120.—Gray, Syn. Rept. p. 14.
Testudo Cafra. Daud. Rept. II. p. 291.

Habitat in Africâ australi.
Mus. nostr.

Descriptio. *Testa* humilis, ferè quinquelateralis, anticè truncata, lateribus subparallelis. *Dorsum* depressum, posticè gibbosum. *Scuta dorsalia* omnia lutea, maculis piceis notata, quarum centrales rotundæ, marginales in fascias radiantes productæ, elevatiuscula, truncata, concentricè sulcata, polita, areolis depressis: *vertebralia* hexagona, sulco profundo a costalibus separata; quintum gibbosum: *costalia* lata, subrectangula; posticum rhomboideum, gibbosum: *marginalia* anteriora horizontalia; primum angulatè prominens; lateralia carinata, non revoluta; paria tria posteriora dentata, revoluta. *Scutum nuchale* brevissimum, quadratum, anticè subbidentatum: *caudale* angulatum, prominens. *Sternum* luteum castaneo-nebulosum, radiis paucis piceis, margine postico quadridentato, obtusè emarginato. *Scuta analia* ad marginem testæ superioris ferè attinentia.

Testæ osseæ mensura.

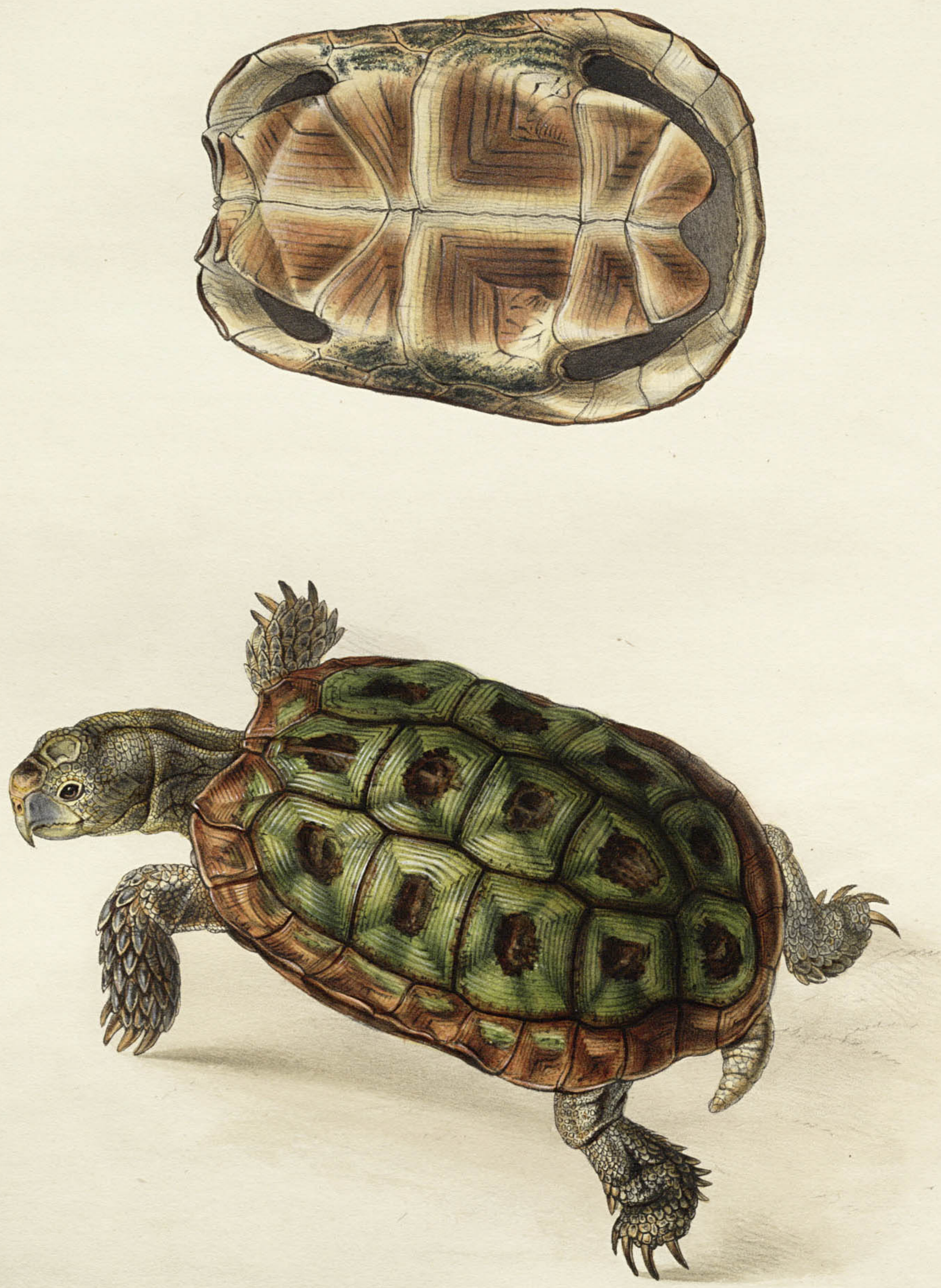
	unc.	lin.
Longitudo dorsi	3	5
Latitudo ejusdem	2	7
Altitudo	1	4

This elegant little species was first described by Wallbaum, and after him by Schœpff, who has given a coarse and daubed, but tolerably characteristic figure of it. The description given by Daudin, under the head "*Testudo*

Cafra," agrees so entirely with this species, that I cannot for a moment doubt their identity. The specimen from which that description was taken, was obtained by Levaillant in Cafraria. One of the natives had it suspended round the neck, to contain a portion of grease which he used for the purpose of anointing his body; it probably therefore wanted the anterior lobe of the sternum, as was the case with the one figured by Schœpff, as well as that in my collection, which is the only specimen I have seen. I am consequently unable to ascertain the length of the sternum, and the exact figure of the anterior margin. It will probably be found to resemble that of *Testudo areolata*.

The only species with which it can be confounded is that which I have just mentioned; and from this it differs in many striking characters. In *T. signata* the dorsum is more depressed. The vertebral and costal plates are all of them about as broad as they are long, whilst in *T. areolata* the first vertebral and the first costal scuta are much longer than they are broad, and the others much broader than they are long. The nuchal plate, in the present species, is rather broader than it is long, at least in my specimen, though Mr. Gray gives as a specific character, "scuto nuchali angustissimo;" a character much more nearly correct if applied to *T. areolata*. The posterior margin only in *T. signata* is revolute; of *T. areolata* the lateral margin is equally or even more so. The colours, too, are very different.

Both these species are very liable to an accidental increase in the number of the dorsal and marginal plates. Some of these variations, which, however, are unimportant in themselves, will be found alluded to in the account of *T. areolata*. Schœpff's specimen of *T. signata* had twenty-six marginal plates, which, from his imperfect knowledge of the laws which regulate the respective number of plates in different forms of the *Testudinata*, he considered as a specific distinction. Mr. Gray, in his Synopsis, has copied this obvious error, retaining as a specific character "scutellis marginalibus xxvi."! This is the more surprising as my specimen, to which he alludes in the very next line as having seen it, possesses only the natural number of all the *Testudinidæ*, namely, eleven pairs, exclusive of the nuchal and caudal ones. The specimen which Daudin describes had twenty-seven marginal plates, besides an additional pair of costal ones.



TESTUDO AREOLATA.

nat. size

J. D. C. Sowerby del. E. Lear del. Printed by C. Hullmandel.

TESTUDO AREOLATA. *Thunberg.*

TESTUDO AREOLATA, *Thunberg*.

Mandibulâ superiori acutè uncinatâ, denticulatâ; squamâ gibbosâ frontali; testâ oblongâ subconvexâ, margine revoluto; scutis sulco profundo separatis, areolis depressis.

La Vermillon. Lacép. Quad. Ovip. 166.
Testudo areolata. Thunb. Nov. Act. Suec. VIII. p. 180.—Schœpff, Test. t. xxiii. p. 104.—Latr. Hist. Nat. Rept. I. p. 157.—Shaw, Gen. Zool. III. p. 50.—Daud. Rept. II. p. 287.—Schweig. Prod. in Konigsb. Archiv. sp. 4.—Merr. Amph. p. 30.—Gray, Syn. Rept. p. 13.
T. pusilla. Daud. Rept. II. p. 299. (neque Linn. nec Schneid.)
Var. scutis marginalibus xxvii.
Testudo Cafra. Daud. Rept. II. p. 291.
T. fasciata ejusd. p. 294.—Merr. Amph. p. 29.

Habitat in Africâ australi, et in Insulâ Madagascar.
Mus. nostr.—Mus. Brit. &c.,

Descriptio. *Caput* magnum, gibbosum, squamosum, fusco-viridescens, squamâ magnâ, corneâ, gibbosâ, rubescente supra nasum. *Mandibulæ* pallidè viridescentes, denticulatæ; *superior* acutè uncinata. *Collum* viridi-fuscum, squamis minutis tectum. *Pedes anteriores* viridescentes, squamis elongatis, lanceolatis, imbricatis, anticè defensi: *posteriores* squamosi. *Ungues* longiores graciles, fusci. *Cauda* crassa, conica, obtusa. *Testa* subconvexa, oblonga, margine revoluto. *Scuta dorsalia* omnia elevata, sulcata, sulco profundo separata, areolis centralibus, depressis, punctatis; color scutorum viridi-flavescens, margine et disco badiis vel fuscis: *vertebralia* elevata, disco truncato-plana, areolis depressis, punctatis, medio carinatis; primum pentagonum, lateribus parallelis; secundum subpentagono-quadratum; tertium quadratum; quartum cuneiforme, posticè truncatum; quintum irregulariter rhomboideum, subverticale: *costalia* declivia; primum latum, anticè productum; secundum et tertium

oblongo-quadrata; quartum quadratum, et reliquis minus: *marginalia* quadrata; primum et secundum horizontalia, plana; reliqua omnia ad marginem testæ revoluto-carinata. *Scutum nuchale* minimum, lineare, anticè acutè prominens: *caudale* latè pentagonum, apice revoluto. *Sternum* lutescens, badio nebulosum. *Scuta jugalia* parva, triangularia, extrorsùm unidentata; *humeralia* subrhomboidea; *pectoralia* introrsùm attenuata, extrorsùm latiora, anticè profundè sinuata; *abdominalia* magna, quadrata; *femoralia* latè quadrata, extrorsùm latiora; *analia* rhomboidea; *axillaria* et *inguinalia* minima.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	4	2
Latitudo ejusdem	3	0
Altitudo	1	8
Longitudo sterni	3	7

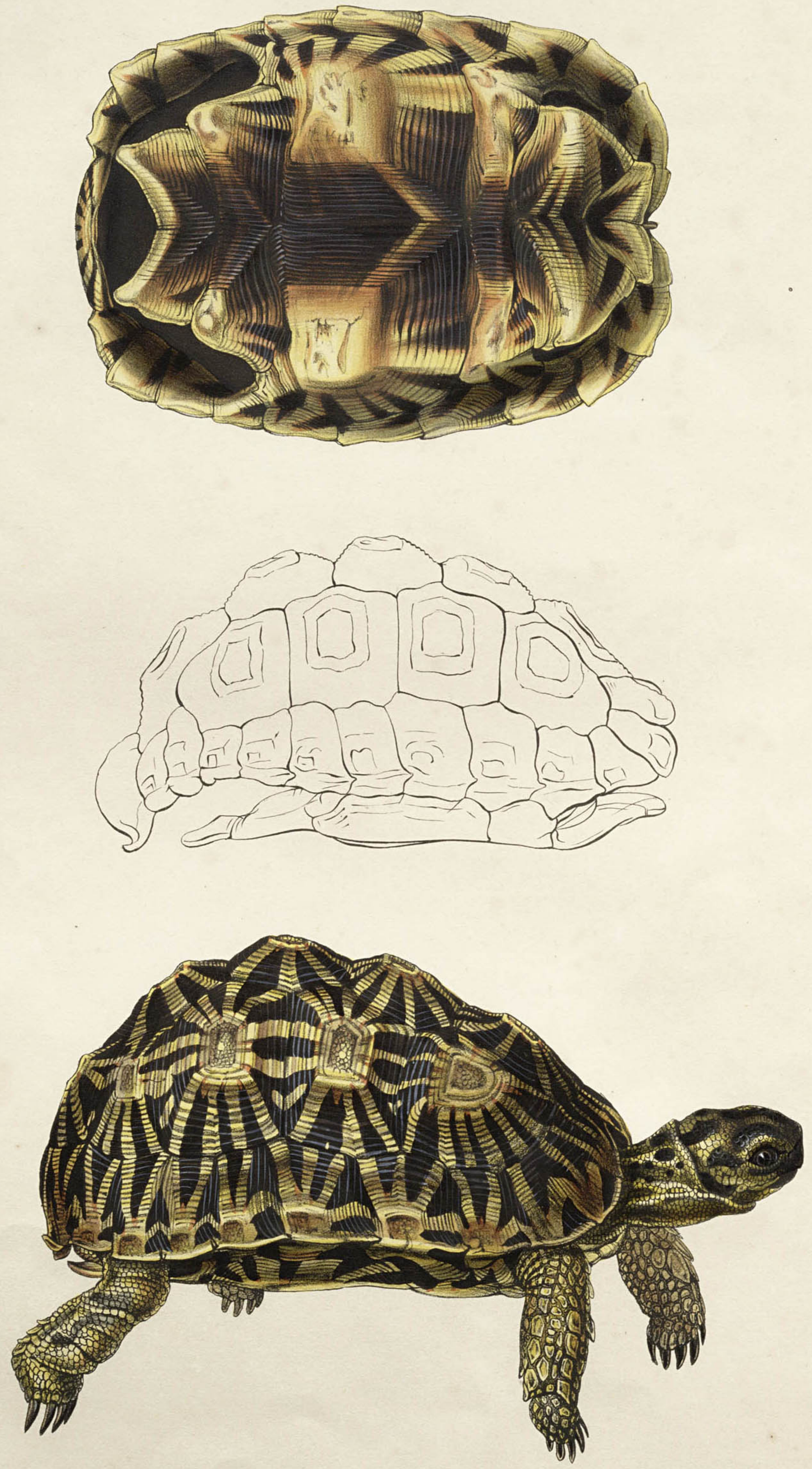
The variations in colour as well as in form, to which this tortoise is liable, have occasioned some former writers to describe its mere varieties as no less than three distinct species, in addition to the original *Testudo areolata* of Thunberg. These are *T. pusilla* of Daudin, or rather of Worm, (*la Vermillon* of Lacépède), *T. Cafra* and *T. fasciata* of the former author; and the descriptions are, fortunately, sufficiently clear to enable us to identify the whole of them with the first-mentioned species. The red horny protuberant scale above the nose, the bright colour of which, in an individual specimen, suggested to Lacépède the name of "Vermillon," exists in all, though it is generally of a dull red or reddish brown. The colour of the plates also varies very much not only in intensity but in hue. Thus of seven specimens now lying before me, no two are sufficiently alike to answer perfectly to a single minute description. The disk and the extreme edge of each dorsal plate are always alike, being of a brown hue, varying from a deep pitch-colour to a light bay. The intermediate space is either bright yellow, dirty greenish yellow, or a bright pale green. The proportions of the two colours also differ in different individuals. Intermixed with the hues just mentioned, there are sometimes obscure traits of purplish brown and of other approximating colours, though I have certainly never seen

any specimen which would justify the description given by Lacépède, "les lames sont agréablement variées de noir, de blanc, de pourpre, de verdâtre, et de jaune." The prevailing colours however are brown, and greenish yellow; and in the specimen from which the present illustrations were taken, both the green and the bay were brighter and paler than in any other I have seen. The sternum is sometimes uniformly yellowish white; but in most there is a considerable portion of light brown or bay in each sternal scutum, which sometimes pervades the greater part of its surface. But it is not in the colours only that this species varies so remarkably; in the form and height of the shell, in the degree of revolution of the margin, and especially in the number of dorsal and marginal plates, it is also liable to some striking accidental deviations. In the latter respect, the variation has sometimes been assumed as a specific character, as in that of *T. Cafra* of Daudin, "margine loricæ dorsalis scutellis 27." This must have arisen from ignorance of the general uniformity of the law which assigns to all the Testudinata with plates, the same number of dorsal scuta, namely thirteen; a rule to which there is but a solitary exception in the case of one species of marine turtle. The additional plates which thus accidentally occur, always appear as if severed from one of the normal ones. I have a specimen in which there are two additional costal scuta, one being introduced on each side between the fourth costal and the fifth vertebral. In another, a small square plate is placed between the fourth and fifth vertebral. In a third, there are ten marginal scuta on one side, and eleven on the other; a fourth has twenty-six marginal plates, and a fifth but twenty-two. All these varieties occur in seven specimens now before me, which have come into my possession promiscuously and without selection.

I cannot agree with those authors who have referred Seba's figure (Tom. I. tab. lxxx. fig. 6.) to this species. It appears to me much more to resemble the young state of *T. tabulata*, to which also the colour, a light yellow, more truly appertains. Nor does it answer to the character of *T. pusilla* of Linnæus, as given both by him and by Schneider. The only tolerable figure with which I am acquainted is that of Schœpff, which however has the distinct marking and the hard abrupt outline of colour which usually belong only to dried specimens.

It is of this species that Kolbe says, as quoted by Lacépède and Daudin, that the eagles of the Cape of Good Hope make their prey, rising with them in their talons to a great height, and letting them fall upon the rock for the purpose of breaking their hard shell, to enable them to devour the animal which it had protected.

It is a species easily familiarized. I have repeatedly had them so tame as to take food readily from the hand, and even to eat from one hand when held in the other. I have received them from Madagascar, and frequently from the Cape of Good Hope. I believe it inhabits the greater part of Africa. The variety termed by Daudin *T. fasciata,* was found in Ceylon.



TESTUDO GEOMETRICA.

J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.

TESTUDO GEOMETRICA, *Linn.*

Testa ovatâ, globosâ: scutis nigris, luteo radiatis, sulcatis, gibbosis, vertebralibus elevatis, areolis depressis: scuto nuchali angusto, elongato.

Sebæ Thes. i. t. lxxx. fig. 8.
Testudo Geometrica. Linn. Syst. Nat. 353. no. 13.—Gmel. 1044.—Schneid. Schildk. sp. xiii. p. 333.—Schoepff. p. 49. t. 10.—Latr. Rept. i. p. 50. —Daud. Rept. ii. p. 250. t. 25.—Shaw, Zool. iii. p. 20. t. 2.—Merrem, Amph. p. 3[illegible].—Gray, Syn. Rept. p. 12.
Junior (sine scutellis?) [illegible] *Testudo* [illegible] Daud. ii. p. 277. t. 25.

Habitat in Indiâ,—in Insula [illegible]—in Africa australi.
Mus. nostr.

Descriptio. *Caput* nigro, luteo et rubro [illegible], squamosum. *Collum* squamis minutis, elevatis, granosis scabrum. *Pedes* [illegible] squamis [illegible], imbricatis, defensi; quarum plurimæ rotundæ; [illegible] elongatæ, lanceolatæ, luteæ. *Ungues* longi, robusti. *Pedes posteriores* [illegible]. *Cauda* brevissima. *Testa* elevata, globosa. *Scuta dorsalia* [illegible], nigra, lineis æqualibus luteis ab areolâ usque ad marginem [illegible] conica, truncata; areolis [illegible] tralibus, depressis; primum [illegible] hexagonum, anticè angustius; tertium transversè hexagonum; [illegible], posticè subattenuatum; quintum margine posteriore [illegible] areolis depressis, prope marginem superiorem [illegible], horizontalia; lateralia carinâ longitudinali [illegible] *Scutum nuchale* lineare, angustissimum; [illegible] luteo- et fusco-nebulosum; anticè [illegible]; [illegible] ad marginem testæ superioris ferè attingens. *Scuta gularia* [illegible] *humeralia* trapezoidea, extrorsùm rotundata; *pectoralia* [illegible]; *abdominalia* magna, quadrata, medio subgibbosa; *femoralia* trapezoidea, [illegible] areolis prominentibus; *analia* rhombea, porrecta, ita ut apertura pro caudâ triangularis et perangusta.

TESTUDO GEOMETRICA.

TESTUDO GEOMETRICA, *Linn.*

Testâ ovatâ, globosâ; scutis nigris, luteo radiatis, sulcatis, gibbosis, vertebralibus elevatis, areolis depressis; scuto nuchali angusto, elongato.

Sebæ Thes. I. t. lxxx. fig. 8.

Testudo Geometrica. Linn. Syst. Nat. 353. no. 13.—Gmel. 1044.—Schneid. Schildk. sp. xiii. p. 353.—Schœpff, p. 49. t. 10.—Latr. Rept. I. p. 80.—Daud. Rept. II. p. 260. t. 25.—Shaw, Zool. III. p. 20. t. 2.—Merrem, Amph. p. 32.—Gray, Syn. Rept. p. 12.

Junior (sine scutellis?) testâ flavâ. *Testudo luteola.* Daud. II. p. 277. t. 25.

Habitat in Indiâ—in Insulâ Madagascar—in Africâ australi.

Mus. nostr.

Descriptio. *Caput* nigro, luteo et rubro variegatum, squamosum. *Collum* squamis minutis, elevatis, granosis scabrum. *Pedes anteriores* squamis magnis, imbricatis, defensi; quarum plurimæ rotundæ; reliquæ majores, elongatæ, lanceolatæ, luteæ. *Ungues* longi, robusti. *Pedes posteriores* flavo-grisei. *Cauda* brevissima. *Testa* elevata, globosa. *Scuta dorsalia* concentricè sulcata, convexa, nigra, lineis æqualibus luteis ab areolâ usque ad marginem radiantibus: *vertebralia* conica, truncata; areolis centralibus, depressis; primum pentagonum; secundum hexagonum, anticè angustius; tertium transversè hexagonum; quartum hexagonum, posticè subattenuatum; quintum margine posteriore latiore: *costalia* gibbosa, areolis depressis, prope marginem superiorem positis: *marginalia* anteriora expansa, horizontalia; lateralia carinâ longitudinali revolutâ; posteriora subdentata, revoluta. *Scutum nuchale* lineare, angustissimum: *caudale* verticale, infrà incurvatum. *Sternum* luteo- et fusco-nebulosum; anticè acutè emarginatum; posticè quadridentatum, et marginem testæ superioris ferè attingens. *Scuta gularia* prominentia, anticè unidentata: *humeralia* trapezoidea, extrorsùm rotundata: *pectoralia* anticè sinuata: *abdominalia* magna, quadrata, medio subgibbosa: *femoralia* trapezoidea, ad areolas prominentia: *analia* rhombea, porrecta, ita ut apertura pro caudâ triangularis et perangusta.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	5	6
Latitudo ejusdem	4	4
Altitudo	3	5
Longitudo Sterni	5	3

The shell of this elegant species has always been admired as one of the most favourite ornaments of amateur museums; but, until of late years, the living animal had scarcely been known to naturalists. Daudin indeed complains that no perfect description had been given of it, as travellers had neglected to bring home entire specimens either stuffed or in spirit; and Schœpff was constrained to figure a shell, of which the anterior lobe of the sternum had been broken away for the purpose of extracting the internal parts, which he says was the case with every specimen he had seen. Within the last few years, however, I have possessed many living individuals of various ages, and have received them from India, from Madagascar, and from the Cape of Good Hope. I have never been able to keep them alive during the whole winter in this climate.

The distinctions between this species and *T. actinodes* are given fully in the account of the latter. There is no doubt that the description given by Lacépède as of *Testudo geometrica,* was taken from a specimen of *T. actinodes.* This is evident from the number of marginal plates which he mentions as belonging to the species, namely twenty-three, which number is invariable in the latter, from the absence of the nuchal plate. Daudin describes the true *T. geometrica,* but gives the other as a variety.

The error into which Lacépède has fallen, in supposing that this species is the *Hicatee* of Browne's Natural History of Jamaica, is one only of numberless mistakes which have arisen from the partial knowledge formerly possessed of these animals, and from a want of giving due consideration to their geographical distribution. I am not acquainted with a single species of land or fluviatile tortoise which can be considered as strictly indigenous to the two

hemispheres. Even *Testudo Indica,* which is found in the Gallapagos Islands, and at the Cape of Good Hope, as well as in India, must probably be considered as having reached the two latter localities only through the medium of commerce, and as being truly indigenous only in the former. The *Hicatee* of Browne is doubtless *T. tabulata.*

Testudo luteola of Daudin is undoubtedly an accidental variety of this species, and not, as Mr. Gray asserts, a mere shell which had lost the plates. It is true that the bony shell of this species, when denuded of the plates, is of a light yellow colour, and there are slight traces of the radiations in a brighter hue on the surface of the bone; but the figure in Daudin, in which the sulci of the plates are very evident, as well as the observations of the author, convince me that it must have been a variety in which the black colour had not been produced. This is the more probable from the fact that the sternum is often found almost wholly of a rich yellow colour.

TESTUDO RADIATA.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

TESTUDO RADIATA.

TESTUDO RADIATA. *Shaw.*

Testâ hemisphæricâ, scutis planis, subimbricato-sulcatis, nigris, luteo-radiatis, areolis subgibbosis; scuto nuchali lato. Pedibus posticis squamis binis corneis, magnis, solidis, posticè armatis.

[illegible] Grew. Mus. Reg. p. 37. t. iii. fig. 1.
[illegible] Daud. Rept. ii. p. 371. t. xxvi.
[illegible] Shaw, Gen. Zool. iii. p. [illegible] t. [illegible] — Gray, Syn. Rept. p. [illegible]

[illegible] in Insula Madagascar.
Mus. [illegible]

Descriptio. *Caput* squamis magnis tectum, nigro, luteo et rubro variegatum. *Mandibulæ* serrato-denticulatæ. *Pedes anteriores* squamis imbricatis tecti, fusci, luteo et rubro maculati. *Pedes posteriores* fusci, squamis rotundatis defensi; *calces* squamis binis corneis, solidis, sustenti. *Ungues* breves. *Cauda* mediocris. *Testa* altè fornicata, globosa; margine anticè et posticè dentato, lateribus integris. *Scuta dorsalia* nigra, luteo radiata, radiis marginem versus dilatatis, plana, lata, subimbricato-sulcata: *vertebralia* areolis vix elevatis; primum pentagonum, angulo antico truncato; secundum, tertium et quartum hexagona; quintum subquadratum: *costalia* lata, plana, areolis subgibbosis; primum et quartum trapezoidea; secundum et tertium pentagona: *marginalia* alta, lata, areolis inferioribus, radiis luteis flabelliformibus, [illegible] expansis; anteriora angulare porrecta; lateralia quadrata, verticalia; [illegible] quatuor posteriora prominentia, dentato-angulata. *[illegible]* latum, porrectum, apice bidentatum; *caudale* latum, verticale, incurvum. *Sternum* luteo et nigro radiatum, tessellatum, planum vel leviter convexum, latum, lobo antico [illegible], postico [illegible] emarginato. *Scuta gularia* rhomboidea, porrecta; *humeralia* pentagona, areolis ad angulum anticoexternum posita; *pectoralia* introrsum angusta, extrorsum dilatata; *abdominalia* maxima, quadrata, areolis [illegible]; *femoralia* quadrata; *analia* transversè rhomboidea.

TESTUDO RADIATA, *Shaw.*

Testâ hemisphæricâ, scutis planis, subimbricato-sulcatis, nigris, luteo-radiatis, areolis subgibbosis; scuto nuchali lato. Pedibus posticis squamis binis corneis, magnis, solidis, posticè armatis.

Testudo tessellata major. Grew, Mus. Reg. p. 37. t. iii. fig. 1.
Testudo Coui. Daud. Rept. ii. p. 371. t. xxvi.
Testudo radiata. Shaw, Gen. Zool. iii. p. 22. t. ii.—Gray, Syn. Rept. p. 11.

Habitat in Insulâ Madagascar.
Mus. nostr.

Descriptio. *Caput* squamis magnis tectum, nigro, luteo et rubro variegatum. *Mandibulæ* serrato-denticulatæ. *Pedes anteriores* squamis imbricatis tecti, fusci, luteo et rubro maculati. *Pedes posteriores* fusci, squamis rotundatis defensi; *calces* squamis binis corneis, solidis, sustenti. *Ungues* breves. *Cauda* mediocris. *Testa* altè fornicata, globosa; margine anticè et posticè dentato, lateribus integris. *Scuta dorsalia* nigra, luteo radiata, radiis marginem versus dilatatis, plana, lata, subimbricato-sulcata: *vertebralia* areolis vix elevatis; primum pentagonum, angulo antico truncato; secundum, tertium et quartum hexagona; quintum subquadratum: *costalia* lata, plana, areolis subgibbosis; primum et quartum trapezoidea; secundum et tertium pentagona: *marginalia* alta, lata, areolis inferioribus, radiis luteis flabelliformibus, sursùm expansis; anteriora angulatè porrecta; lateralia quadrata, verticalia; paria quatuor posteriora prominentia, dentato-angulata. *Scutum nuchale* latum, porrectum, apice bidentatum: *caudale* latum, verticale, incurvum. *Sternum* luteo et nigro radiato-tessellatum, planum vel leviter convexum, latum, lobo antico undulato, postico latè emarginato. *Scuta gularia* rhomboidea, porrecta: *humeralia* pentagona, areolâ ad angulum antico-externum posita: *pectoralia* introrsùm angusta, extrorsùm dilatata: *abdominalia* maxima, quadrata, areolis gibbosis: *femoralia* quadrata: *analia* transversè rhomboidea.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	10	2
Latitudo ejusdem	8	0
Altitudo	6	4
Longitudo sterni	9	5

The synonyms of this beautiful species are involved in some obscurity, and I have carefully avoided inserting any which appeared doubtful. It was first described by Grew in his account of the rarities in the Museum of the Royal Society, in which work it is well figured. Daudin, ignorant of this book, describes it as a new species, and gives it the name of *T. Coui;* but as Shaw had already applied to it the appropriate name of *radiata,* it has been retained by most subsequent authors. Merrem however considers it as identical with *T. calcarata* of Schneider, and makes the specific character to depend upon a circumstance which never occurs in this species, namely the existence of two spurs on the thighs. Mr. Gray*, misled doubtless by this error, describes a tortoise in the Paris Museum as a variety of the present species, "ano bicalcarato." There is not however the slightest appearance of such a character in any individual which I have seen; and the only species in fact to which it would be strikingly applicable is *T. pardalis,* to which the term *calcarata* may possibly have been, in the first instance, applied. There are however two large strong horny scales at the heel of each hinder foot, which I consider as a good specific character.

By an unaccountable oversight, Mr. Gray has given, as one of the specific characters of this species, "scutello nuchali nullo;" whereas the nuchal plate is comparatively very large and projecting.

There is no possibility of confounding *T. radiata* with any other species. The extraordinary elevation, and especially the spherical form of the shell, exclusive of the characters of the other parts, are at once sufficient to distinguish it. Although the colours are the same as in *T. geometrica, actinodes,* and

* Syn. Rept. p. 11.

[illegible], and although, as in these species, the yellow markings and lines are disposed in radii, yet there are some remarkable peculiarities, even in this respect, which it may be useful to particularize. One of the most striking of these is that all the yellow radii, which in *T. geometrica* are linear, have, in this species, a remarkable disposition to expand towards the circumference. The proportional quantity of yellow varies exceedingly in different specimens, not only from the different breadth, but also from the variable number of the radii. But however they may differ in this respect, there are certain characters about the direction of the markings and the essential existence of some of them, which are at once so constant and so characteristic as to require a more detailed description.

[illegible] exception, [illegible] or yellowish brown, and the [illegible] and pass straight to the [illegible] [illegible] *geometrica* [illegible] the [illegible] with very few [illegible] ted to the ante- [illegible] has two small rays in the [illegible] numerous broader ones extending to [illegible] second and third have three passing to the three [illegible] more downwards to the margin: the fourth has [illegible] rays; but in the costal plates there is scarcely [illegible] om one to the other. The rays of the mar- [illegible] om the areolæ, which are placed at the [illegible] the shape of a fan, diverging [illegible] The nuchal plate has in some [illegible] The caudal follows [illegible] yellow colour obtains [illegible] The gular plates are almost [illegible] yellow

half of the humeral, form an irregular rhomb of that colour. The pectoral plates are black, excepting a transverse line of yellow extending from the areolæ directly to the median line of the sternum, where it meets that of its fellow; it has also several yellow rays directed outwards and forwards on its broad portion. The abdominal plates have each a broad equilateral triangle of yellow, meeting its fellow at the median line, and by their union forming a perfect lozenge, generally interrupted only by occasional rays of black. The yellow marking of the two femoral plates together forms nearly a rectangular triangle, of which the hypothenuse constitutes the posterior boundary, joining the anal plates; these have each a yellow triangle marked with black rays.

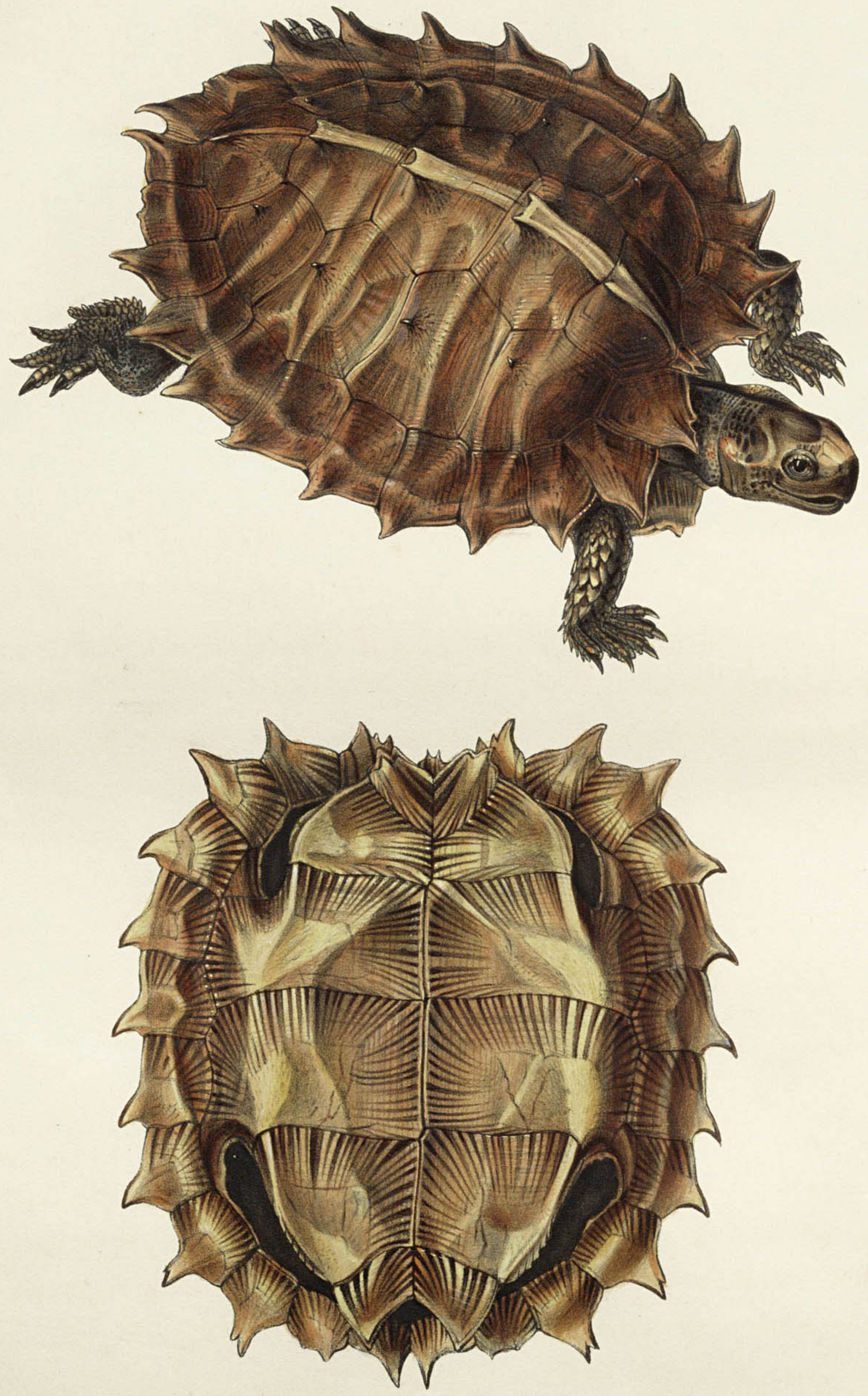
I have thought it necessary to be the more particular in the description of these peculiarities, in consequence of errors which had been committed by some earlier writers who had confounded this species with *geometrica*.

I had never seen this showy tortoise living until the year 1828, when a considerable number were brought to this country from Madagascar; and I kept several of them alive during the summer. The shells had however been rather common in collections for some years before. Its habitat is now so well ascertained, and so generally known, that a formal refutation of Shaw's opinion that it might be the *Hicatee* of Brown's Jamaica, is wholly unnecessary.

J. D. C. Sowerby del. E. Lear lithog.

EMYS SPINOSA. *Bell.*

Printed by C. Hullmandel.



EMYS SPINOSA, *Bell.*

Young.

J. D. C. Sowerby, del. E. Lear, lithog. Printed by C. Hullmandel.

EMYS SPINOSA, *Bell.*

[illegible]

EMYS SPINOSA, *Bell.*

Testâ (junioris) suborbiculari, depressâ, luteo-fuscâ, dorso carinato; areolis magnis, punctatis, spinis uncinatis, centralibus armatis; margine spinosè dentato; sterno luteo, piceo-radiato.

Emys spinosa. Bell.—Gray, Ind. Zool.—Syn. Rept. 20.

Habitat in India—("apud Penang, Capt. Hay." Gray).
Mus. nostr. et Dom. Leadbeater.

Descriptio. *Caput* pallidè fuscum, supra nasum lutescens, maculâ pone aures aurantiâ. *Maxillæ* integræ, undulatæ. *Collum* fusco-olivaceum, squamis minutis tectum. *Pedes* olivacei; *anteriores* squamis luteis, lanceolatis, imbricatis—*posteriores* squamis parvis, luteo-fuscis—*digiti* suprà squamis luteis, quadratis, subimbricatis, tecti; *ungues* parvi, acuti. *Cauda* brevis, subacuminata, scabra. *Testa* fusco-badia, cordato-orbicularis, margine explanato, acutè et profundè dentato: *dorsum* subelevatum, altè carinatum; carina lata, obtusa, anticè et posticè angustata, ad partem posteriorem scutorum primi, secundi, tertii et quarti, bispinosa, quinti unispinosa. *Scuta* leviter sulcata, areolis magnis, punctatis, prope marginem posteriorem positis: *vertebralia* primum pentagonum; secundum, tertium et quartum hexagona; quintum quadrilaterum, posticè latius et rotundatum: *costalia* declivia, areolis spinâ acutâ, retrorsùm uncinatâ, armatis; primum triquetrum, margine anteriore rotundato; secundum et tertium pentagona; quartum tetragonum: *marginalia* horizontalia, ad marginem externo-posticum in spinam acutam producta. *Scutum nuchale* exiguum, carinatum, bispinosum. *Sternum* altum, ad latera rotundatum, anticè bifidum, prominens, posticè trigono-emarginatum. *Scuta sterni* lutea, lineis piceis radiata; *jugalia* porrecta, anticè spinosa; *humeralia* quadrilatera, margine externo rotundato; *pectoralia* latè quadrata, antico-extrorsùm profundè sinuata; *abdominalia* latè-, *femoralia* subæquè-quadrata; *analia* rhomboidea, posticè acuminata; *axillaria* trigona; *inguinalia* quadrata.

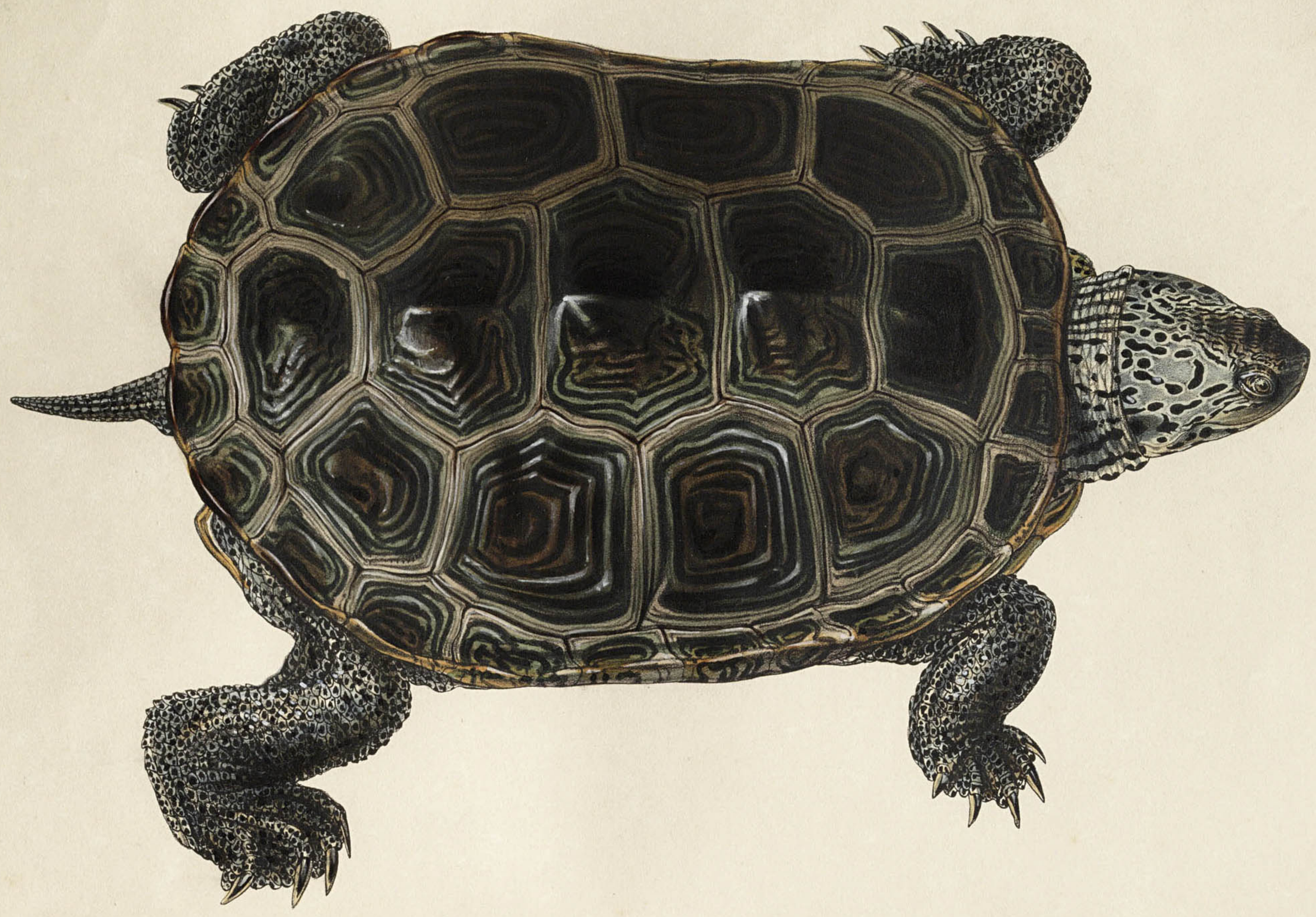
EMYS SPINOSA.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	4	2
Latitudo ejusdem	4	0
Longitudo sterni	3	8
Altitudo	1	8

I owe to Mr. Leadbeater the knowledge of this beautiful and interesting species. The figure was taken from a dried specimen in his possession, which, with his accustomed liberality, he allowed me to describe and to have copied. Since that, Mr. Gray has kindly presented me with a specimen of the shell, which has been figured in his Illustrations of Indian Zoology. Both these are evidently very young. The size of the areolæ, and the small extent of ossification which has taken place in the shell, prove that it must, in its adult state, be of considerable size; probably not less than eight or ten inches in length. The description which I have given must therefore be considered as provisional, as it is impossible to say what changes may take place during the growth of the animal.

There is a very remarkable similarity between this species and that which I have named *Emys orbicularis,* to the young of which Mr. Gray has, in his Synopsis, applied the specific term "*Dhor.*" Looking at the adult state of the latter species, it would appear almost certain that it must be the same as the present, as the differences are similar in general character to those which are produced by age in other species; but the possession of *E. orbicularis* in three different stages of growth, from three inches to more than eight in length, enables me to decide that they are essentially and strikingly distinct. In the latter species there is not, even at the youngest period, the least appearance of hooked spines on the costal areolæ, nor are there any denticulations on the lateral and anterior margin. The colour also is very different, although there are similar radiations on the sternum.



EMYS CONCENTRICA. *a*.

J. D. C. Sowerby del. E. Lear lithog.

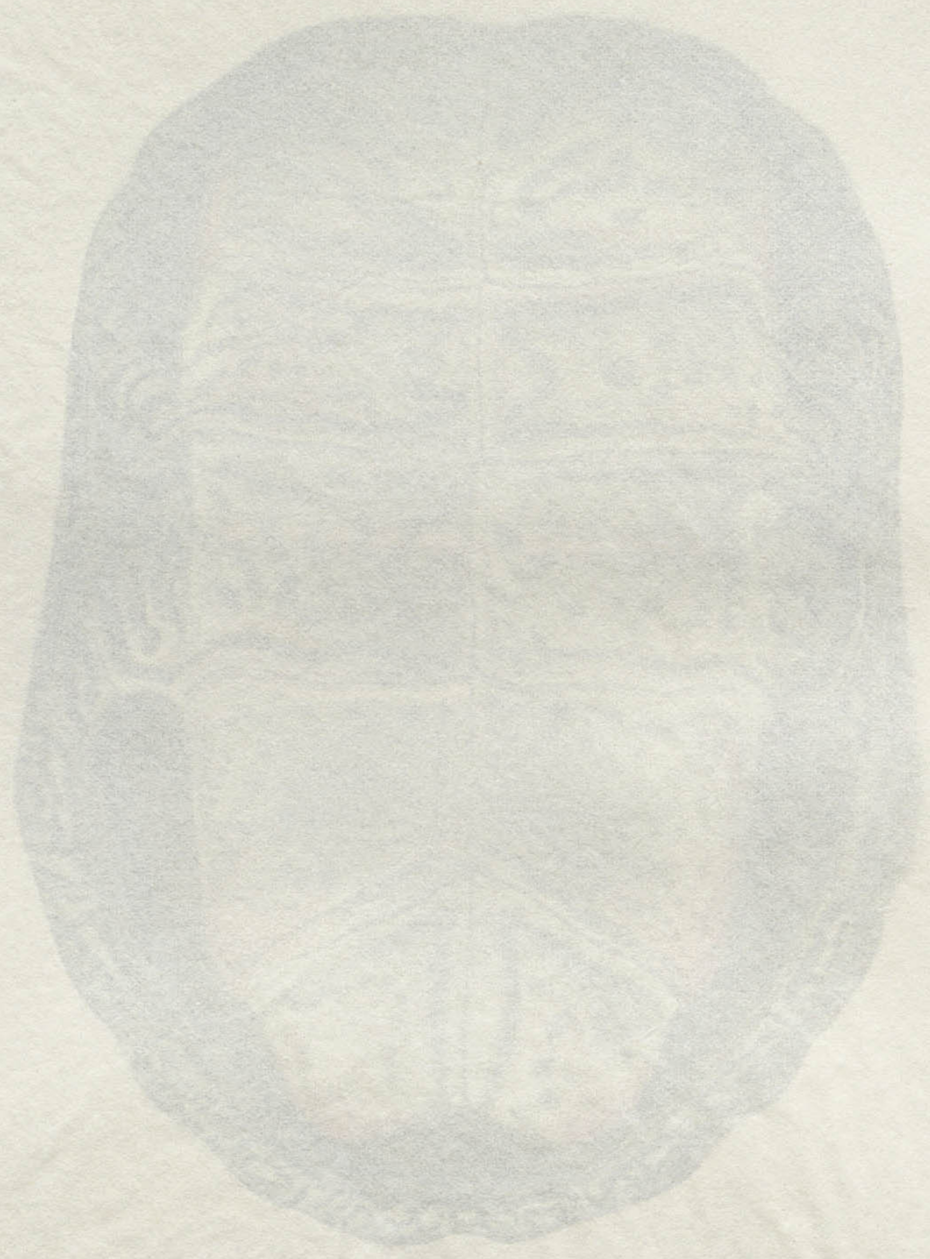
Printed by C. Hullmandel.

EMYS CONCENTRICA.

Under Side.

J. D. C. Sowerby del. E. Lear lithog.

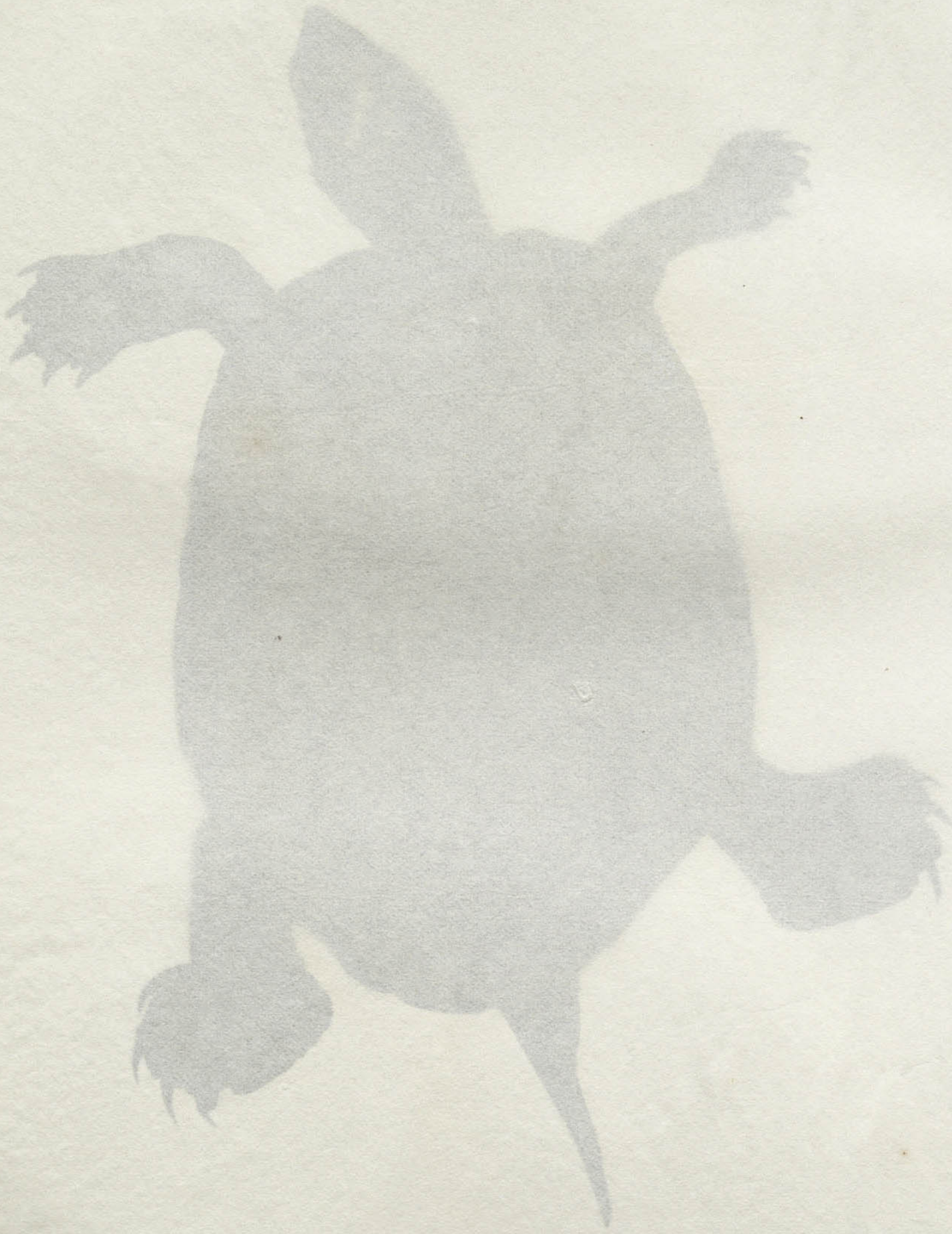
Printed by C. Hullmandel.

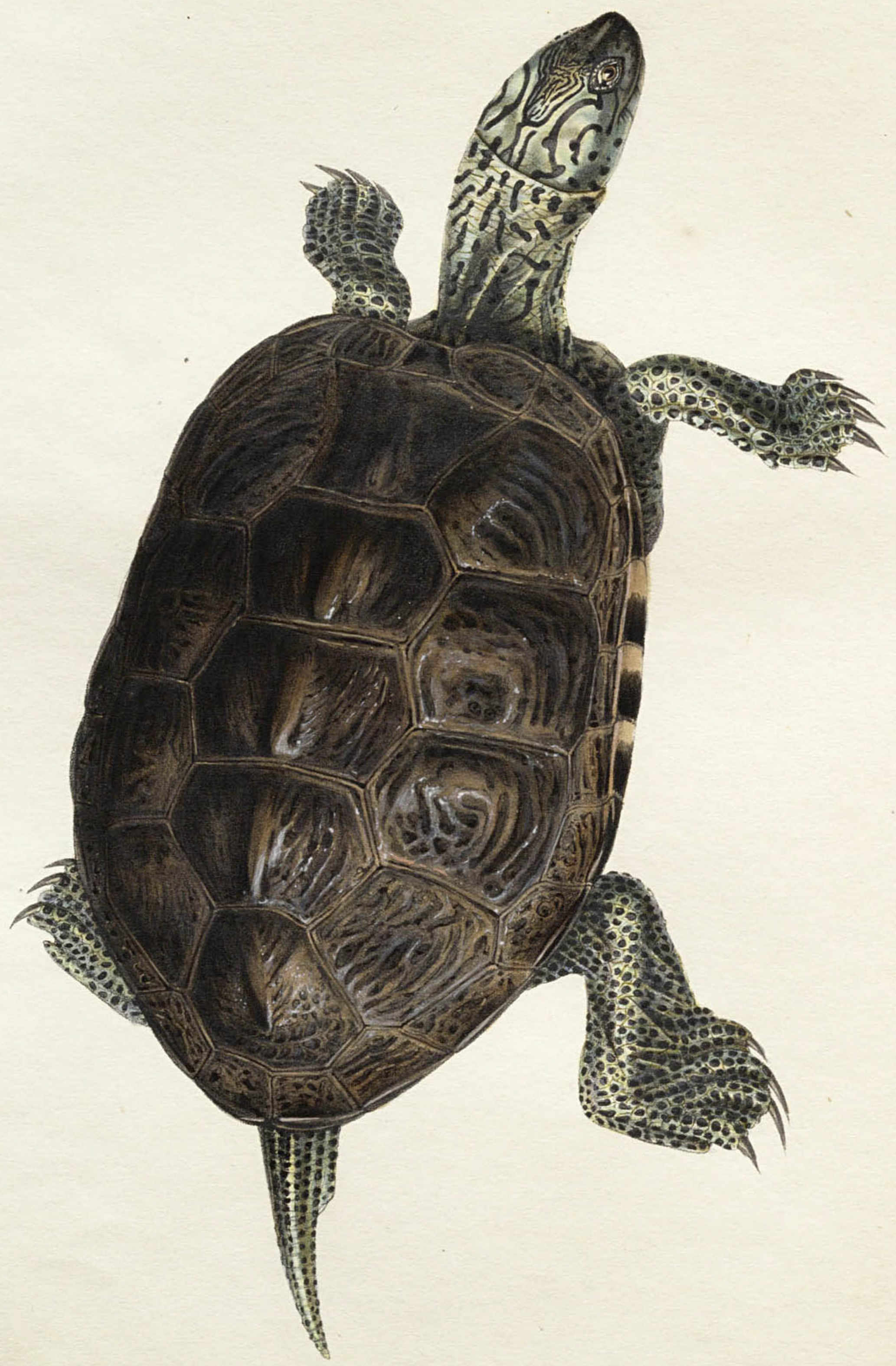


EMYS CONCENTRICA. *b.*

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.





EMYS CONCENTRICA, c.

J. D. C. Sowerby, del. E. Lear, lithog.

Printed by C. Hullmandel.

EMYS CONCENTRICA, *Shaw.*

Testâ ovali (in junioribus [illegible] subpentagonâ), subconvexâ, interruptè carinatâ, scutis dorsalibus sulcatis, zonis fuscis concentricis; pelle viridescente nigro punctatâ.

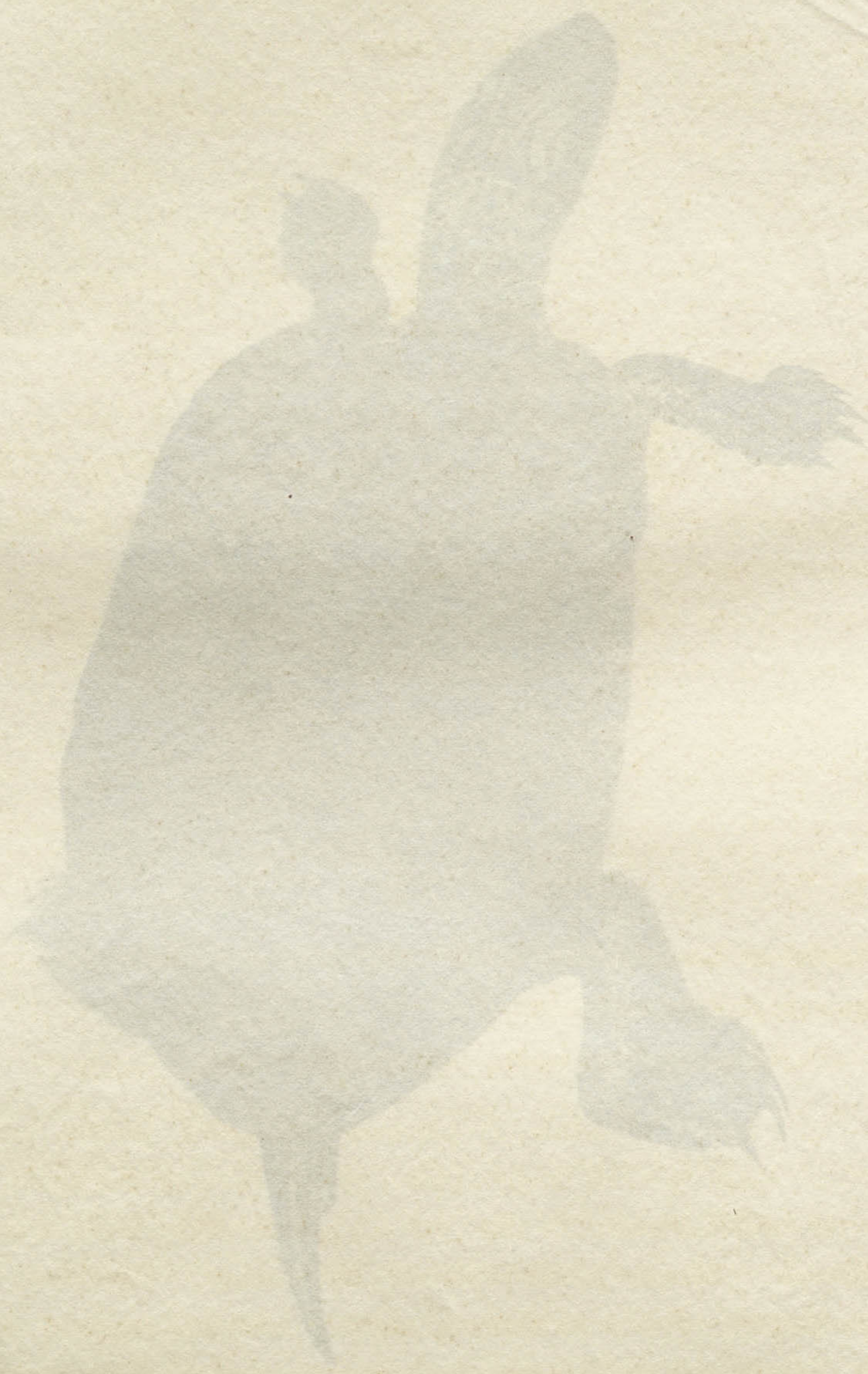
? *Terrapin.* Brown, Hist. Jam. p. 466.
? *Testudo palustris.* Gmel. Syst. Nat. i. p. 1041. sp. 25.
T. Terrapin. Schœpff. Test. t. xv. p. 54.
? *La Terrapène.* Lacép. Quad. Ovip. i. p. 129.
Testudo concentrica. Shaw, Gen. Zool. iii. t. 43. f. ix. f. 1.
La Tortue à lignes concentriques. Bosc, Nouv. Dict. d'Hist. Nat.
Testudo centrata. Latr. Rept. i. p. 145.—Daud. Rept. ii. p. 153.
Emys centrata. Schweig. Prod. sp. 15.—Merr. Amph. p. 26.—Say, Journ. Acad. Sc. Phil. iv. pp. 205. 211. sp. 6.—Fitzing. Rept. sp. 45.
Terrapene palustris. Bonap. Test. Eur. et Amer. Bor. p. 157.
Emys concentrica. Gray, Syn. Rept. p. 27.

Var. α. Testâ saturatè fuscâ vel nigrâ, scutis dorsalibus profundè sulcatis, margine toto revoluto; sterno pallidè fusco, maculis subradiantibus.
β. Scuto verticali, collo, pedibus atque testâ nigris.
γ. Capite atque cute totâ pallidè viridibus, maculis lineisque nigris.
δ. Testâ rufescente, zonis et areolis fuscis; sterno pallidè castaneo.
ε. Testâ unicolori, sc. sordidè virescente; scutis obsoletè sulcatis.

Habitat in Americæ borealis provinciis temperatis et calidioribus, præcipuè in paludibus maritimis subsalsis.

Mus. nostr.—Vivit quoque in horto nostro suburbano.

Descriptio. *Caput* latum, robustum, in plurimis viridescens, [illegible] scuto verticali magno, plano, glabro, elongato-rhomboideo, in [illegible] nigro vel sordidè olivaceo, in aliis (var. γ.) pallidè viridi, lineis et maculis [illegible] nigris, notatum. *Maxillæ* leviter subdilatæ, flavescentes. *Oculi* flavi, [illegible] pustulâ. *Collum* viridescens, nigro punctatum, rugosum, latum, capite angustius. *Pedes* robusti, depressi, [illegible] palmati, virides, nigro punctati; *ungues* [illegible] mediocres, vix curvi, viridescentes. *Cauda* longa, gracilis, sordidè viridescens.



EMYS CONCENTRICA, *Shaw.*

Testâ ovali (in junioribus ovato-subpentagonâ), subconvexâ, interruptè carinatâ, scutis dorsalibus sulcatis, zonis fuscis concentricis; cute viridescente, nigro punctatâ.

? *Terrapin.* Brown, Hist. Jam. p. 466.
? *Testudo palustris.* Gmel. Syst. Nat. I. p. 1041. sp. 23.
T. Terrapin. Schœpff, Test. t. XV. p. 54.
? *La Terrapène.* Lacép. Quad. Ovip. I. p. 129.
Testudo concentrica. Shaw, Gen. Zool. III. p. 43. t. ix. f. 1.
La Tortue à lignes concentriques. Bosc, Nouv. Dict. d'Hist. Nat.
Testudo centrata. Latr. Rept. I. p. 145.—Daud. Rept. II. p. 153.
Emys centrata. Schweig. Prod. sp. 11.—Merr. Amph. p. 26.—Say, Journ. Acad. Sc. Phil. IV. pp. 205. 211. sp. 6.—Fitzing. Rept. sp. 45.
Terrapene palustris. Bonap. Test. Eur. et Amer. Bor. p. 157.
Emys concentrica. Gray, Syn. Rept. p. 27.

Var. α. Testâ saturatè fuscâ vel nigrâ, scutis dorsalibus profundè sulcatis, margine toto revoluto; sterno pallidè fusco, maculis subradiantibus.
β. Scuto verticali, collo, pedibus atque testâ nigris.
γ. Capite atque cute totâ pallidè viridibus, maculis lineisque nigris.
δ. Testâ rufescente, zonis et areolis fuscis; sterno pallidè castaneo.
ε. Testâ unicolori, sc. sordidè virescente; scutis obsoletè sulcatis.

Habitat in Americæ borealis provinciis temperatis et callidioribus, præcipuè in paludibus maritimis, subsalinis.

Mus. nostr.—Vivat quoque in horto nostro suburbano.

Descriptio. *Caput* latum, robustum, in plurimis viridescens, punctis numerosissimis nigricantibus, scuto verticali magno, plano, glabro, elongato-rhomboideo, unicolori, sc. nigro vel sordidè olivaceo, in aliis (var. α.) pallidè viride, lineis et maculis variis, nigris, notatum. *Maxillæ* levitèr undulatæ, flavescentes. *Oculi* flavi, nigro minutissimè punctulati. *Collum* viridescens, nigro punctatum, rugosum, laxum, capite angustius. *Pedes* robusti, depressi, latè palmati, virides, nigro punctati: *ungues* fortes, mediocres, vix curvi, viridescentes. *Cauda* longa, gracilis, sordidè viridescens,

nigro punctati. *Testa* ovalis vel subpentagono-ovata, subconvexa, interruptè carinata, margine ferè integro, vel posticè crenulato, ad latera revoluto, anticè rotundato, et levitèr emarginato. *Scuta dorsalia* glabra, concentricè sulcata, fusco-viridescentia, nigro concentricè zonata: *vertebralia* obtusè carinata, in junioribus quasi tuberculata; primum pentagonum; secundum, tertium et quartum hexagona; quintum irregulariter hexagonum, interdùm subpentagonum, margine posteriore latum, rotundatum: *costalia* plana, declivia, primum quadrilaterale, figuræ irregularis, margine superiore angustiore, inferiore lato, rotundato; secundum et tertium pentagono-quadrata, angulis inferioribus rectis; quartum rhomboideum, parvum: *marginalia* quadrata, lateralia subrevoluta: *scutum nuchale* quadratum, latum. *Sternum* latum, anticè subtruncatum, posticè emarginatum, flavescens, scutis singulis lineis et maculis fuscis concentricè notatis: *scuta jugalia* triangularia: *humeralia* quadrilatera, introrsùm angustata: *pectoralia* oblongè quadrata, extrorsùm profundè sinuata: *abdominalia* reliquis majora, quadrata: *femoralia* magna, trapezoidea: *analia* rhomboidea.

Var. *α.* scuta dorsalia habet omninò nigra, profundè sulcata, margine toto revoluto; et sternum pallidè fuscum, plagis subradiantibus. In Var. *β.* (Tab. *b.*) scutum verticale, collum, pedes, cauda atque testa nigri sunt. In Var. *γ.* (Tab. *c.*) caput, collum, pedes et cutis tota, pallidè virides, maculis, lineis et punctis nigris notati. In Var. *δ.* testa rufescens, zonis fuscis; et sternum pallidè castaneum. In Var. *ε.* testa unicolor est, sordidè olivacea, sulcis scutorum obsoletis.

In junioribus testa oblongè subpentagona, carinâ vertebrali altiore, abruptè interruptâ, et sulcis scutorum profundioribus. In pullis testa suprà pallidè fusca, sternum albidum, nigro minutissimè punctatum.

Scutis dorsalibus amotis, testa ossea colorem flavum exhibet, zonis clarè nigris.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	8	5
Latitudo	6	2
Longitudo sterni	7	5
Altitudo	3	2

This species appears to have received the name of *concentrica* from Dr. Shaw, in the same year in which Latreille and Daudin applied to it that of

centrata. I have retained the denomination of our English naturalist, sanctioned as it is already by Mr. Gray in his Synopsis. The appellation "*Tortue à lignes concentriques,*" under which Bosc described it, is as well rendered by one as by the other of the Latin specific names above mentioned. Its identity with *Testudo palustris* of Gmelin is too doubtful to authorize the application of that term, though we have the authority of Schœpff, of Leconte, and of the Prince of Musignano in its favour.

This Tortoise is far from uninteresting, whether regarded as to its zoological characters, its remarkable and numerous varieties, or its excellence as a nutritive and delicious article of food. The concentric furrows and coloured markings of its plates at once distinguish it from all other species; but its characters vary so much, not only in different specimens, but even in the same individual at different periods of life, that I think it will not be destitute of utility to notice some of the most remarkable of these variations.

When the young one first leaves the egg, it is of a light brown colour, without concentric lines, each vertebral plate having a rounded tubercle, which forms the centre of its future carina. At this period the head and the skin of the neck and limbs are uniformly brown, without any of the spots which characterize the older specimens; and the sternum is of a brownish white colour, dotted over the greater part of its surface with minute points of brown or blackish. When about half grown the concentric furrows are very deep and sharp, the colour generally deep brown or black, and the carina on each vertebral plate high and tubercular. As it advances in age and size, the carina is less prominent, the sulci become softened, and the plates, less deeply coloured and more transparent, exhibit the dark concentric zones by which the species is so well distinguished. On stripping off the plates, the pattern is seen distinct and vivid on the surface of the bone beneath, consisting of black zones strongly marked out upon a yellow ground. It was from a specimen in this state that Shaw's figure in the General Zoology was taken, though he was ignorant of the cause of this peculiar appearance.

I have not thought it necessary to distinguish every minute variation of colour which we see assumed by this very variable species. I have, however, endeavoured to characterize the most striking and remarkable varieties. The

first, and one of the most peculiar, is distinguished by very deep furrows on all the dorsal plates, by the whole margin being revolute, and by the spots on the sternal plates assuming a radiating instead of a concentric form. The second variety (Plate *b.*) has the vertical plate, the greater part of the neck, the feet and tail, as well as the shell, of a black colour, the anterior part of the neck and the sides of the head only approaching the usual colours of the species. In the third variety (Plate *c.*) the skin is of a brightish and pale green colour, with black lines on the head and neck, and black spots and dots on the rest of the body and limbs, the shell being nearly black. This is the only variety which I have seen in which the vertical plate has been of more than one colour; in all others it is of an uniform black or greenish hue, and very distinct from the rest of the head. The fourth variety I was tempted to consider as a distinct species when I had seen but few specimens; I had even given it the appellation *E. livida**; but I have long been convinced that this was an error. It is of an uniform livid green colour, with the dorsal scuta very slightly furrowed. The sternum is equally without markings, and of a dull greenish yellow colour. A fifth variety, which attains to a very large size, has the dorsal plates of a rufous or reddish brown colour, with darker concentric lines, and the sternum of a light chestnut.

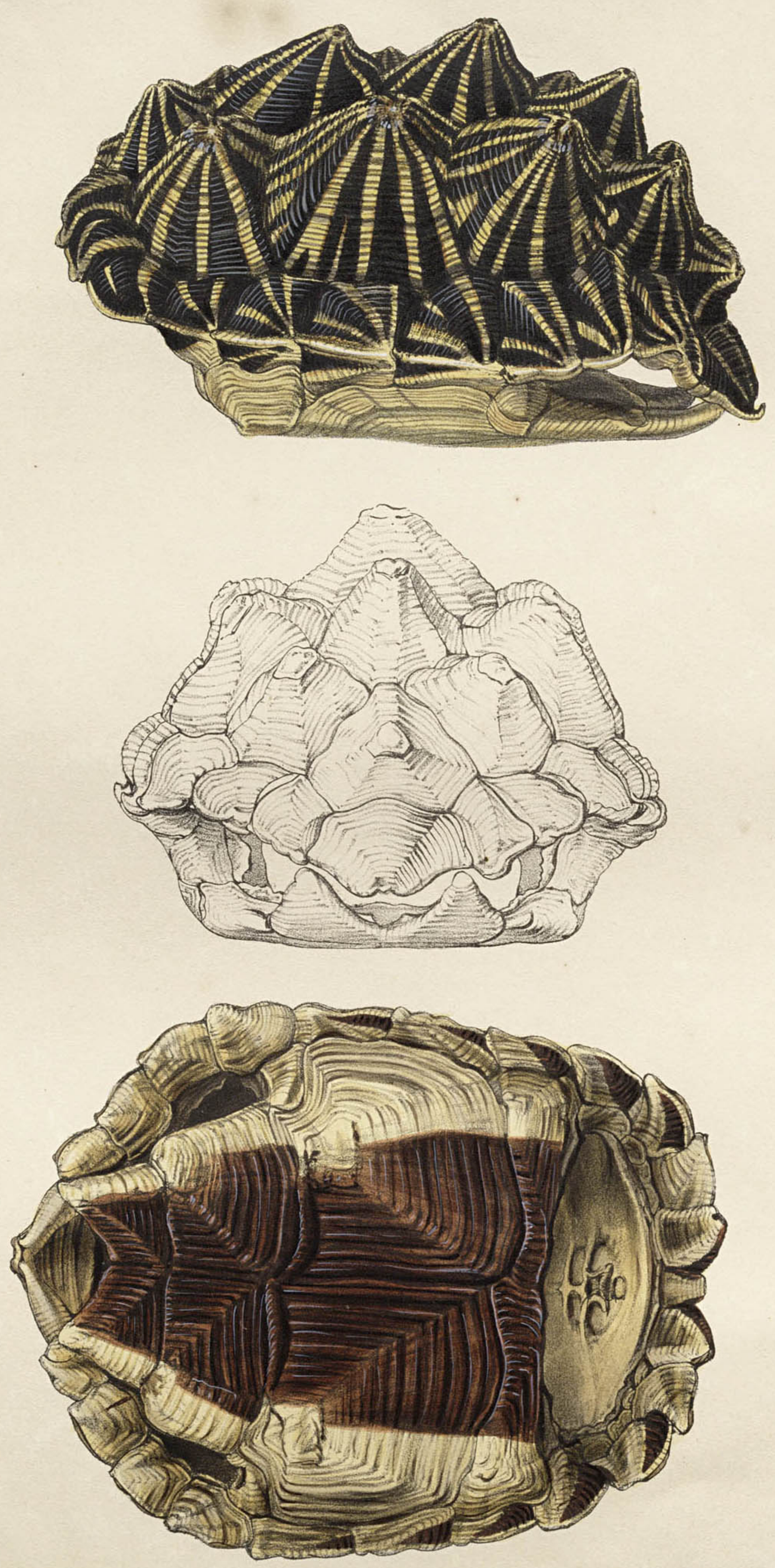
The usual colours of the species are as follow. The head is greenish with numerous black dots; the vertical plate, which is of the form of an elongated lozenge, is either green or black; the eyes are bright yellow, with the pupil and many minute dots black; the neck, the feet, the tail, and the skin of the thighs are all greenish with irregular black dots, most of which are angular; the dorsal plates are of a dull olive, with brown concentric rings, and some other markings of the same colour are occasionally found, especially on the vertebral plates; the sternum is yellowish, with a light brown line running within the margin of each plate, usually formed of irregular elongated spots, though in some they are quite continuous; within this line are various spots and irregular markings of the same colour; and the areola of each plate is in most cases orange, gradually fading off into the light ground colour of the sternum.

* *Vide* Gray, Syn. Rept. p. 27.

The account of the habitat of this species given by the Prince of Musignano, is that it is found in great abundance in the United States from New York as far south as the Floridas, particularly in Maryland and Virginia, as well as in the West Indies. It delights in the neighbourhood of such marshes as are alternately overflowed by salt and fresh water; from which circumstance it is, as I am informed, called the Saltwater Terrapin. Its flesh is esteemed a most delicious food; and my friend Dr. Harlan, of Philadelphia, informs me that it is so much sought for on this account, that it has almost wholly disappeared for a considerable distance around that city. It is considered as particularly nourishing and easy of digestion for invalids.

I have received many of this species from different parts of the United States, and have had during the last winter six of them hibernating at the bottom of a small pond in the neighbourhood of London, the whole of which were kindly sent me about twelve months since by Mr. Monefeldt of Charlestown, South Carolina. They remained in perfect health and activity during the summer and early part of the autumn, seeking their final winter's retreat at the bottom of the water at the latter end of October. Two of these died at the commencement of the spring: the remaining four are now (June 1834) in perfect health. Some individuals which hibernated in the same situation during a former winter, died in the spring; but I doubt not that with care they may be made to bear this climate, and probably may be easily naturalized in the South of Europe. The Prince of Musignano has thus expressed this expectation: "Ho cercato d' introduirle fra noi, e spero tuttora di riuscirvi."

It was in an individual of this species that I ascertained the fact that a perfect new horny plate may be formed under the old one, which it gradually displaces. I found that one of the anterior costal plates was loosening at the edges, and by watching it from time to time, observed that it became more and more detached, until it fell off quite whole, and apparently uninjured. The new plate was exactly like the old one, and in a few days it could not be perceived that any change had taken place.



J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.

TESTUDO TENTORIA.

TESTUDO TENTORIA. *Bell.*

Testâ ovatâ, globosâ; scutis nigris, luteo radiatis; vertebralibus conicis, acutis, areolis parvis; scuto nuchali exiguo, brevissimo, revoluto.

Testudo tentoria. Bell, Zool. Journ. III. p. 420. Tab. Sup. xxiv.
Testudo geometrica β. Gray, Syn. Rept. p. 12.

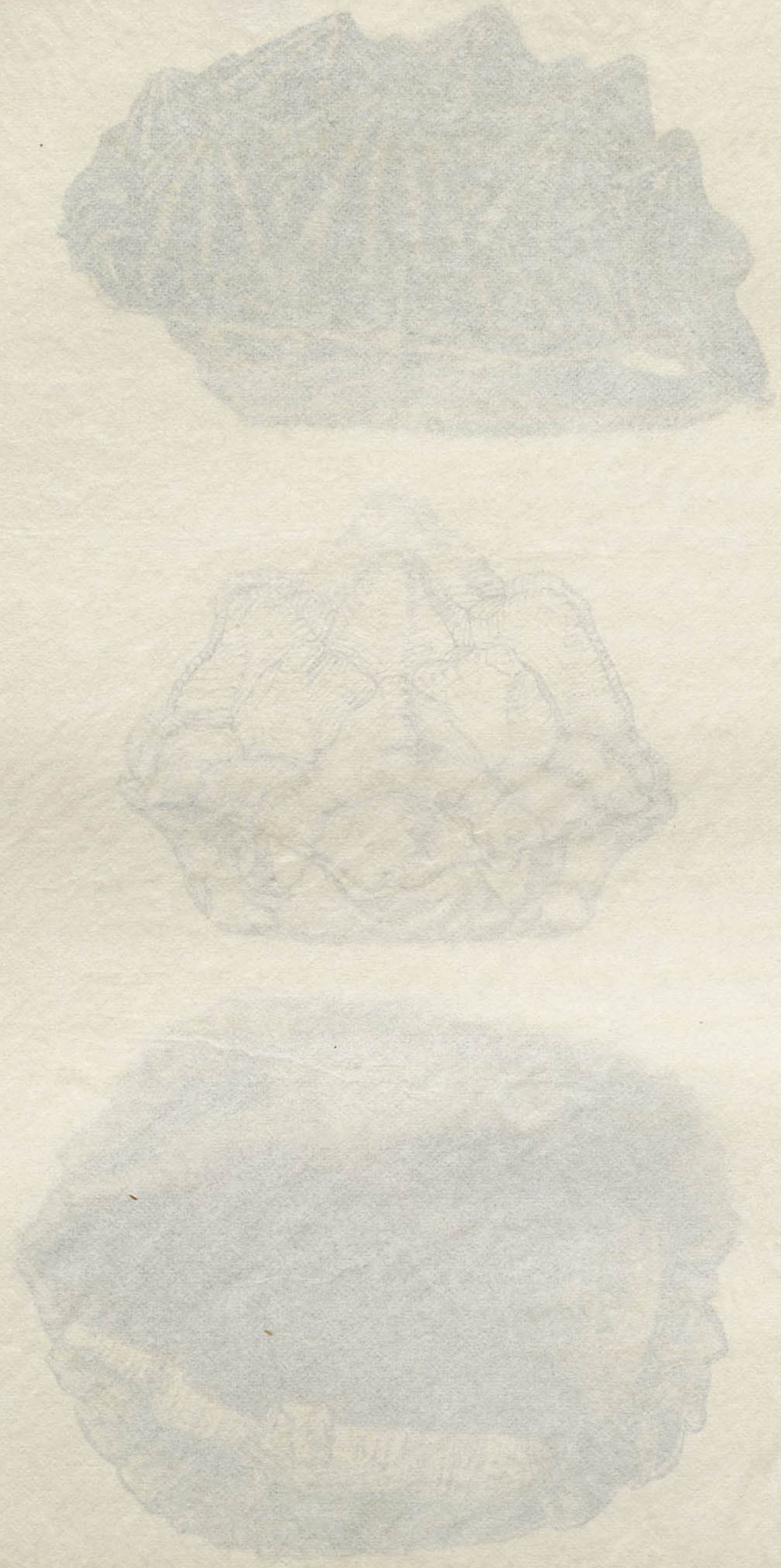
Habitat in Africâ?
Mus. nostr.

Descriptio. *Testa* solida, alta, latè ovata, margine denticulato. *Scuta dorsalia* sulcata, nigra, luteo radiata; radiis marginem versus dilatis: *vertebralia* elevata, conica, acuta, areolis minimis ad apicem terminata; primum pentagonum, anticè acutum; secundum hexagonum, posticè latius; tertium hexagonum, lateribus ferè æquis; quartum hexagonum, posticè angustius, reliquis altius; quintum pentagonum: *costalia* gibbosa, areolis elevatis: *marginalia* gibbosa, tria anteriora et tria posteriora prominentia, angulata; areolæ ad angulum posticum positæ. *Scutum nuchale* brevissimum, revolutum: *caudale* pentagonum, prominens. *Sternum* medio fuscum, lateribus flavis; posticè acutè emarginatum. *Scuta axillaria* angulata, ad marginem testæ superioris attingentia.

Testæ osseæ mensura.

	unc.	lin.
Dorsi longitudo	4	2
Latitudo ejusdem	3	3
Altitudo	2	7

I am constrained to give but a very imperfect description of this singular species, which was first made known by myself in the Zoological Journal, and figured in the supplementary Plates of that work. I have seen but one



TESTUDO TENTORIA, *Bell.*

Testâ ovatâ, globosâ; scutis nigris, luteo radiatis; vertebralibus conicis, acutis, areolis parvis; scuto nuchali exiguo, brevissimo, revoluto.

Testudo tentoria. Bell, Zool. Journ. III. p. 420. Tab. Sup. xxiv.
Testudo geometrica β. Gray, Syn. Rept. p. 12.

Habitat in Africâ?
Mus. nostr.

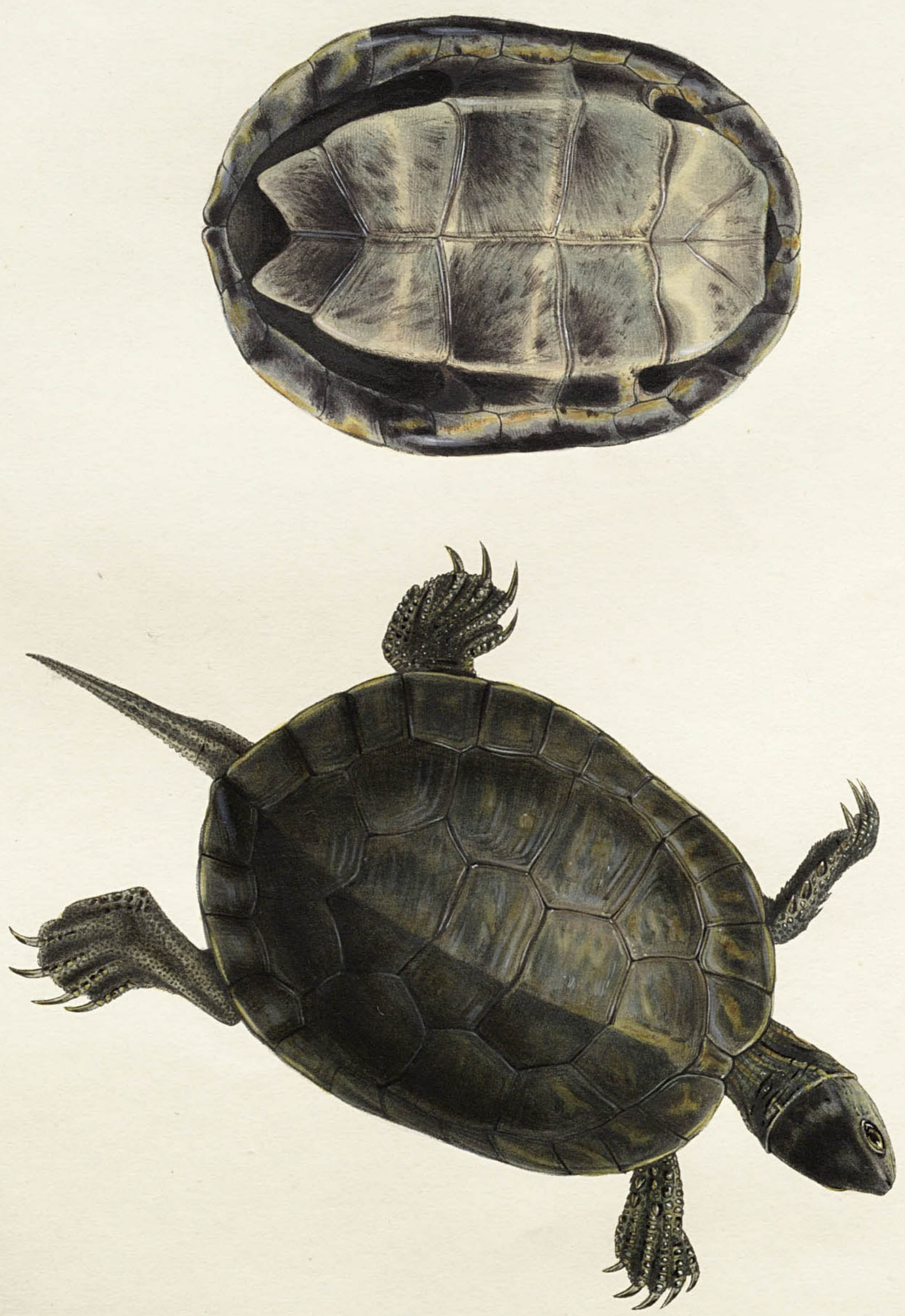
DESCRIPTIO. *Testa* solida, alta, latè ovata, margine denticulato. *Scuta dorsalia* sulcata, nigra, luteo radiata; radiis marginem versus dilatis: *vertebralia* elevata, conica, acuta, areolis minimis ad apicem terminata; primum pentagonum, anticè acutum; secundum hexagonum, posticè latius; tertium hexagonum, lateribus ferè æquis; quartum hexagonum, posticè angustius, reliquis altius; quintum pentagonum: *costalia* gibbosa, areolis elevatis: *marginalia* gibbosa, tria anteriora et tria posteriora prominentia, angulata; areolæ ad angulum posticum positæ. *Scutum nuchale* brevissimum, revolutum: *caudale* pentagonum, prominens. *Sternum* medio fuscum, lateribus flavis; posticè acutè emarginatum. *Scuta analia* angulata, ad marginem testæ superioris attinentia.

Testæ osseæ mensura.

	unc.	lin.
Dorsi longitudo	4	2
Latitudo ejusdem	3	3
Altitudo	2	7

I am constrained to give but a very imperfect description of this singular species, which was first made known by myself in the Zoological Journal, and figured in the supplementary Plates of that work. I have seen but one

specimen, which consists only of the shell, and even this mutilated by the absence of the anterior lobe of the sternum. I am therefore unable to say anything respecting the head, limbs and tail, upon which so much depends in ascertaining the characters of approximating species. I cannot however avoid considering this as distinct from *T. geometrica,* of which Mr. Gray states it to be a variety. The extraordinary elevation and conical form of the vertebral plates; the minuteness of the areolæ terminating the apex of the cones; the extreme shortness of the nuchal plate; the projecting direction of the caudal; the sternum extending backwards as far as the margin of the dorsal shell, and the remarkable colouring of this part, are all so many characters distinguishing it from *T. geometrica,* and appear to me to be sufficiently important, taken together, to warrant the opinion which I have adopted, that they are distinct species. It must however be acknowledged that it would be far more satisfactory if we could examine a number of specimens, and particularly living ones.



EMYS LUTARIA. *a*.

J. D. C. Sowerby, del. E. Lear lithog. Printed by C. Hullmandel.

EMYS LUTARIA, *young.*

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel

EMYS LUTARIA, *Lacep.*

Olivacea; collo pedibusque luteo striatis; testâ ovatâ, depressâ, subcarinatâ; sterno anticè truncato, posticè trigono-emarginato; capite suprà plano, laminâ unicâ glabrâ tecto; caudâ longâ, gracili, acutâ.

Testudo lutaria. Linn. Syst. Nat. (?)—Lacep. Quad. Ovip. t. iii. f. 1.
Emys lutaria. Schweig. Prod. sp. 18.—Merrem, var. β. γ. Amph. 25.
Testudo caspica. S. G. Gmel., Reise durch Russ. T. iii. S. 59. t. 10. 11.—Gmel. Syst. Nat. 1041.—Daud. Rept. II. p. 124.—Schneid. Schildkr. p. 344.—Shaw, Gen. Zool. III. p. 63.
Emys caspica. Schweig. Prod. sp. 21.
Clemmys caspica. Wagler, Icon. et Descr. Amph. f. II. t. xxiv.
Emys vulgaris. Gray, Syn. p. 24.

Habitat in Hispaniâ (*Wagler*), in Asiâ occidentali, in Africâ boreali.
Mus. nostr.—Mus. Brit. &c.

Descriptio. *Caput* humile, planum, collo paulò latius, pyramidale, pileo laminâ unicâ, glabrâ tecto, olivaceum, ad latera et subtùs flavo vel luteo striatum. *Oculi* lutei, lineâ transversâ, nigrâ dimidiati. *Maxillæ* integræ, acutæ. *Collum* depressiusculum, cute laxâ, granulosâ tectum, olivaceo-fuscum, lineis longitudinalibus luteis, infrà pallidius, et in nonnullis flavescens. *Pedes* robusti, compressiusculi, cute rugulosâ et anticè squamosâ tecti, olivacei, flavo lineati. *Digiti* suprà squamosi. *Ungues* compressi, acuti, subtùs excavati. *Cauda* longa, gracilis, ad basin crassa, apicem versus sensìm attenuata, acuta, ruguloso-granosa, olivacea, flavo obscurè lineati. *Testa* ovata, humilis, margine integerrimo; in animali adulto olivacea, suprà obsoletè carinata; in juniori viridi-olivacea, rufo et luteo variegata, et ruguloso-tricarinata. *Scuta dorsalia* in adulto glabra, in pullo rugosa: *vertebralia* paulò elevata; primum pentagonum, medio elevatiusculum; secundum et tertium ferè plana, hexagona,

latiora quàm alta; quartum hexagonum, posticè sinuatum, subcarinatum; quintum irregularitèr pentagonum, carinatum: *costalia* declivia; quorum primum et quartum trapezoidea, secundum et tertium quadrata, quartum omnium minimum: *marginalia* lævia, quadrata, margine extremo paulò replicato: *scutum nuchale* quadratum, anticè angustatum. *Sternum* planum, ad latera rotundato-subcarinatum, anticè truncatum, posticè trigono-emarginatum; nigricans, vel olivaceum, flavo plùs minùs variegatum: *scuta gularia* triangularia; *humeralia* trapezoidea, intùs angustiora; *pectoralia* et *abdominalia* quadrata; *femoralia* trapezoidea; *analia* rhomboidea.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	5	5
Latitudo ejusdem	4	0
Longitudo sterni	5	2
Altitudo	2	0

The want of a proper appretiation of the characters of the Testudinata has in no instance been more strikingly shown, or led to greater confusion and difficulty, than in the case of the present species. From the time of Linnæus until the present hour, this doubt and confusion have continued to perplex naturalists. The common freshwater Tortoise of Europe, described by Lacépède, from different ages and varieties, under the names of "la jaune," "la ronde," "la bourbeuse," is, in fact, *Terrapene europæa*, the structure of which, as a Box Tortoise, I demonstrated in the second volume of the Zoological Journal. These three designations of Lacépède were, it appears, a sufficient authority to lead many subsequent writers to describe these different varieties or ages of the species in question as distinct, retaining the names of *europæa* and *lutaria*. On a careful examination of Lacépède's descriptions, however, I thought I could here and there discover some traces of a different species; and his figure of "la bourbeuse" in the original edition of his great work, appears to me certainly to have been taken from an individual of that now under consideration, and for which I have retained the name of *lutaria*,

[illegible]

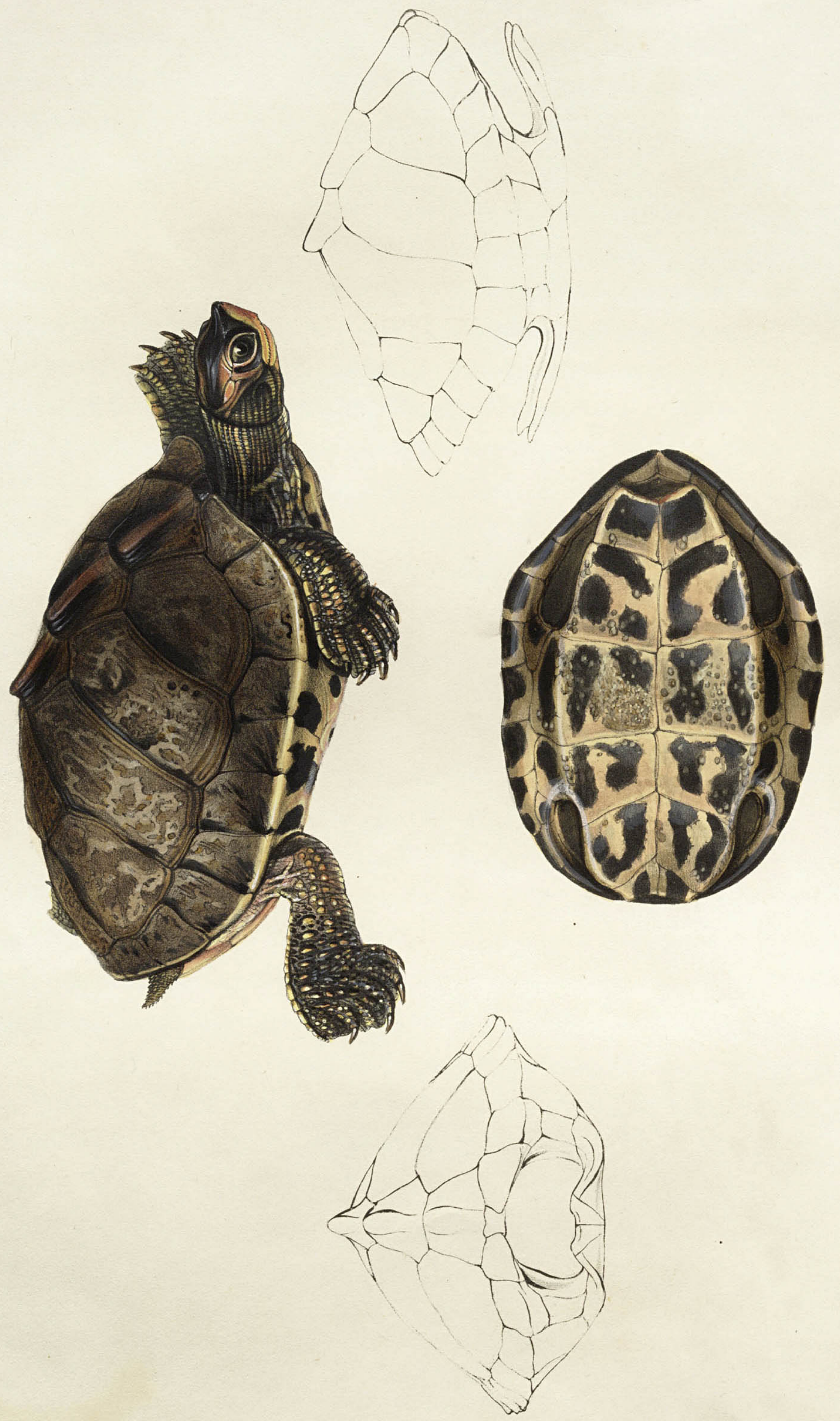
format, a mari tam parum remotam, ut hujus accessus et recessus in illa animadverti possit. Hic vivat animal, et cum homines adpropinquantes audiat, repente saltando quasi in aquam salit. Agile est, et ambulans sive natans, caudam exserit, et collum in altum tollit; resupinatum in marte proprio, celeriter resurgit, et interdum vocem tenuissimam edit. Degit quoque in Hispania."

This Author is mistaken in considering *Testudo scripta* of Schœpff, as the young of this species; it is undoubtedly the young of *Emys serrata*.

This animal varies considerably at different periods of life, and, as it would appear, also from climate and other local circumstances. When very young, the head, neck and feet are marked with reddish lines and dots, which become yellow as the animal reaches the adult period; and there are also at that time red markings on the dorsal and marginal plates, which become obsolete and at length wholly disappear. In the oldest specimens there is no marking whatever upon the shell, which is of a dirty greenish olive colour. In the Asiatic specimens, as we see from Wagler's figure, the yellow lines are brighter and larger than in others.

There is a peculiarity in many individuals which almost entitles them to be considered as a distinct variety; this is a rugose state of the dorsal plates, with three distinct carinæ,—one along the middle of the vertebral plates, and one on each side on the upper part of the dorsal. These characters always exist in a greater or less degree in the young animal; but I have also several specimens of adult age in which it still continues very strongly marked. Mr. Gray has given a representation of a shell in this state, in his Synopsis.

The sternum is no less liable to variation. In some it is pale greenish or olive, clouded with yellow; in others, it is almost wholly black; and there are others with almost every intermediate shade and hue.



EMYS TECTUM. *Bell.*

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

EMYS TECTUM. *Bell.*

Testâ ovatâ, margine integro, suprà olivaceâ; dorso elevato, lateribus planis, declivibus; scutis levibus, vertebralibus primo, secundo et præcipuè tertio, carinatis, carinâ posticè acutè angulatâ; sterno pallidè rubro, nigro maculato.

Emys Tectum. Bell.—Gray. Illust. Ind. Zool.—*E. Tecta*, Syn. Rept. p. 23. t. v.

Habitat in Indiâ.
Mus. nostr.—Mus. Brit.

Descriptio. *Caput* nigro et rubro variegatum; vertice [illegible] lateribus et occipite rubris. *Mandibulæ* cinereæ, rubro maculatæ. *Collum* olivaceum, [illegible] fasciis longitudinalibus flavis. *Pedes anteriores* olivacei, [illegible] [illegible] *posteriores* [illegible]. *Ungues* [illegible]. *Cauda* brevis. *Testa* olivacea, levis, pentagono-ovata, medio elevata, margine integro, lateribus declivibus. *Scuta vertebralia* elevata; tria anteriora carinata; carina rubra, nigro marginata, posticè [illegible]; primum [illegible], secundum et tertium hexagona; quartum pentagonum, [illegible]; quintum [illegible], posticè rotundatum. [illegible] [illegible] margine integro. [illegible]

Testæ mensuræ.

	unc.	lin.
Dorsi longitudo	4	5
Latitudo ejusdem	3	3
Longitudo sterni	4	2
Altitudo	[illegible]	5

EMYS TECTUM, *Bell.*

Testâ ovatâ, margine integro, suprà olivaceâ; dorso elevato, lateribus planis, declivibus; scutis levibus, vertebralibus primo, secundo et præcipuè tertio, carinatis, carinâ posticè acutè angulatâ; sterno pallidè rubro, nigro maculato.

Emys Tectum. Bell.—Gray, Illust. Ind. Zool.—*E. tecta*, Syn. Rept. p. 23. t. v.

Habitat in Indiâ.
Mus. nostr.—Mus. Brit.

Descriptio. *Caput* nigro et rubro variegatum, vertice nigro, lateribus et occipite rubris. *Mandibulæ* cinereæ, rubro maculatæ. *Collum* olivaceum, suprà nigricans, lineis longitudinalibus flavis. *Pedes anteriores* olivacei, squamis flavis et rubescentibus, externis majoribus, tecti: *posteriores* nigricantes. *Ungues* mediocres, cinerei. *Cauda* brevis. *Testa* olivacea, levis, pentagono-ovata, medio elevata, margine integro, lateribus declivibus. *Scuta vertebralia* elevata; tria anteriora carinata; carina rubra, nigro marginata, posticè angulato-prominens; primum pentagonum, anticè truncatum; secundum et tertium hexagona; quartum pentagonum, anticè productum; quintum subhexagonum, posticè rotundatum: *costalia* plana; primum trapezoideum; secundum et tertium pentagona; quartum rhomboideum: *marginalia* levia, declivia, margine integro. *Scutum nuchale* quadratum, breve. *Sternum* rubescens, nigro maculatum, elongatum, angustum, medio planum, ad latera subcarinatum, anticè truncatum, subintegrum, posticè emarginatum. *Scuta sterni* omnia plùs minùs quadrata.

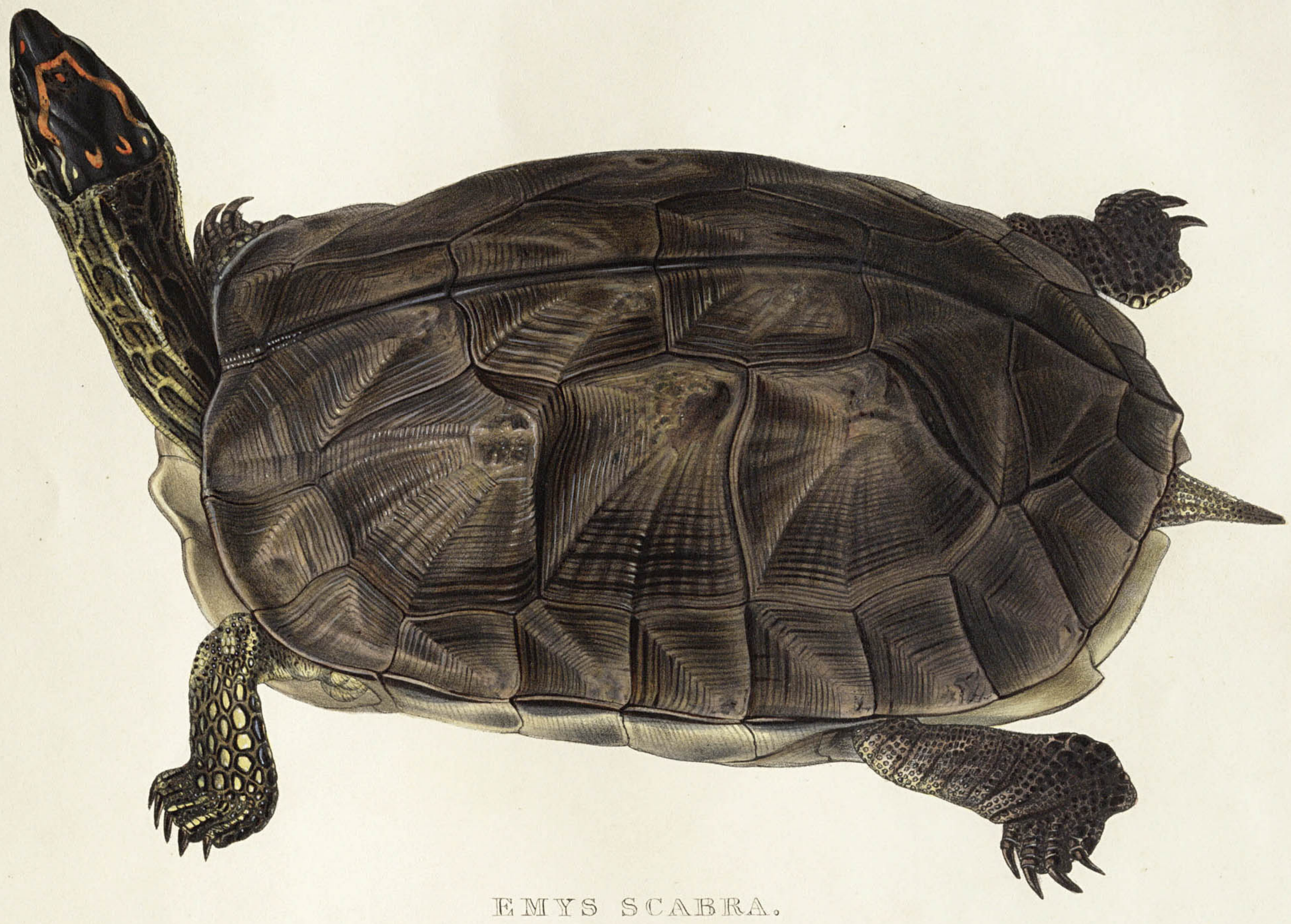
Testæ osseæ mensura.

	unc.	lin.
Dorsi longitudo	4	5
Latitudo ejusdem	3	3
Longitudo sterni	4	2
Altitudo	3	3

There is scarcely another species of tortoise which stands so completely alone in the peculiarity of its form as this. Although agreeing with some other Indian species in the character of its sternum, which is perfectly flat in the centre, and almost carinated at the sides, as well as in the entireness of the margin, it differs from these and from all other fluviatile species in the elevation of the upper shell. It is considerably raised in the centre, and descends in a straight line to the margin on each side; so that lines drawn from the central ridge to the margin, and across from one side of the margin to the other, would form nearly a rectangular triangle, of which the latter is the hypothenuse. The carina on the three first vertebral plates is very prominent, and terminates, at the posterior part of the third, in a prominent spine. There is also a slight carina on the two hinder vertebral plates in some specimens. The resemblance which the shell bears to the roof of a house, suggested the specific name *Tectum*, which Mr. Gray has, in his Synopsis Reptilium, misquoted "*tecta*," covered, or, as he has translated it, "*tented*."

It is now several years since I first became possessed of a specimen of this species. Since that time I have obtained six or eight dried specimens, and two living ones, which, however, would not feed, and died after they had been in this country a few months. Amongst the extensive collection of drawings which General Hardwicke had formed in India, and which exhibits a splendid example of zeal and liberality in the pursuit of natural science, was one of this species, taken from the life, which has since been published in the Illustrations of Indian Zoology. This representation is very faulty in the drawing, and the colours are by far too bright.

It may perhaps be worth mentioning, that several intestinal worms, of the genus *Ascaris*, passed from one of the individuals which I possessed. They are about an inch and half in length, and rather slender. I know of but one other instance of a tortoise being infested by these parasites.



EMYS SCABRA.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

a

EMYS SCABRA.

a, the Egg.

J. D. C. Sowerby del: E. Lear lithog:

Printed by C. Hullmandel.

EMYS SCABRA. *Linn.*

EMYS SCABRA, *Linn.*

Capite nigricante, supernè fasciis duobus, posticè divergentibus—supra nasum atque occiput maculis binis—omnibus rubris, ornato. Testâ oblongâ, convexâ, carinatâ, fusco nebulosâ.

Testudo punctularia. Daud. Rept. II. p. 349.
Testudo (Chersine) punctularia. Merrem, Amph. p. 29.
Emys punctularia. Schweig. Prod. sp. xix.—Gray, Syn. Rept. 25.
Junior. Sebæ Thes. I. t. lxxix. f. 1. 2. p. 126?—Gronov. Zoophyl. n. 74. p. 17.
Testudo scabra. Linn. Syst. Nat. 351?
La Raboteuse. Lacép. Quad. Ovip. t. x. p. 161.—Daubent. Enc. Méth.
Testudo scabra. Latr. Hist. Nat. Rept. I. p. 148.—Daud. Rept. II. 129.
Testudo dorsata. Schœpff, Test. p. 136.
Emys dorsualis. Spix, Rept. Braz. p. 11. t. ix. f. 1. 2.
Emys scabra. Gray, Syn. Rept. p. 24.

Habitat in Americâ meridionali.
Mus. nostr.

Descriptio. *Caput* mediocre, subacutum, nigrum, suprà fasciis duabus anticè unitis, postice divergentibus—maculis binis super nasum, et totidem super occiput—lineolis etiam pluribus lateralibus pone oculos—omnibus rubris, post mortem pallescentibus. *Mandibulæ* rubescentes. *Collum* longum, extensile, rugosum, granulosum, suprà nigricans, lineolis luteis, punctatis; subtùs flavescens. *Pedes anteriores* anticè lutei nigro punctati, posticè fusci, squamosi, squamis exterioribus majoribus. *Pedes posteriores* nigri, squamis parvis tecti. *Ungues* parvi, breves. *Cauda* brevis, triangularis, granulosa. *Testa* ovato-oblonga, anticè truncata, posticè subacuta, convexa, in medio excelsè carinata, margine ad latera revoluto, posticè subdentato. *Scuta* fusca, nebulosa, obscurè sulcata, rugosa, lineis punctato-elevatis ab areolarum angulis usque ad marginem scutorum radiantibus, areolis granulosis, scabris: *vertebralia* omnia carinata, areolis posticis; primum pentagonum; secundum et tertium quadrata vel subhexagona; quartum hexagonum, posticè angustius; quintum minimum pentagonum: *costalia* declivia, areolis prope marginem posteriorem positis; primum subtri-

gonum, margine exteriore rotundata; secundum et tertium magna, quadrata, vel subpentagona; quartum minus, quadratum: *marginalia* anteriora trigona, plana; tertium ad octavum quadrata, carinâ longitudinali revolutâ, areolis posticis; tria sequentia expansa, areolis prominulis: *caudalia* minora, elevata: *scutum nuchale* minimum, lineare. *Sternum* convexiusculum, latum, anticè truncatum, posticè trigono-emarginatum, medio fuscum, ad latera flavescens. *Scuta* sterni omnia plana, glabra, vix sulcata: *gularia* trigona, anticè unidentata; *humeralia* quadrilatera, margine exteriore rotundato; *axillaria* et *inguinalia* exigua; *pectoralia* quadrata, propè angulum externo-anticum, sinuata; *abdominalia* quadrata; *femoralia* et *analia* minora, irregulariter quadrilatera, excavata, posticè porrecta.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	8	0
Latitudo ejusdem	6	0
Altitudo	4	5
Longitudo sterni	7	6

"Parmi les diverses tortues," says Daudin, "qui ont été décrites par Linnæus dans l'édition 12 de son *Systema Naturæ*, il n'y en a sans doute aucune qui ont occasionné autant de contestations parmi les naturalistes que la Tortue raboteuse (*Testudo scabra*)." This observation is amply confirmed by the list of synonyms which I have given, and which has not been adopted without the most careful and rigorous examination.

The young of many species, already known and differently named in the adult state, have been described as distinct; and such specific terms as *scabra, verrucosa, scripta, sculpta, punctularia,* have been applied to them, from the mere character of the areolæ,—the surface of which has the same general appearance in all,—without considering that no permanent characters can belong to a part which, as I have before explained, constitutes the sole covering of the shell when the animal is first excluded from the egg, and ultimately forms the centre of the scuta. Thus *Testudo scripta* of Schœpff is the young of *Emys serrata; T. scabra* of Retz, that of *Hydraspis galeata; T. sculpta* of Spix, of *T. tabulata;* and in the present instance we find assigned to the young animal

the name *Testudo scabra* by Linnæus, followed by Daubenton in the Encyclopédie Méthodique, by Lacépède, by Latreille, and others; whilst Schœpff gives to the same animal, and probably at the same age, the name of *T. dorsata;* and Spix, long afterwards, describes it as a new species, under the name of *Emys dorsualis*. Finally, Daudin, who had followed the former authors in giving it the name of *T. scabra,* under which he very properly arranges it in the fresh-water family, was the first naturalist who described the adult animal, naming it *T. punctularia;* but he erroneously considered this as a land tortoise,—thus placing the same species, at different ages, in two very distinct groups. Upon the most careful consideration, I feel convinced that they are identical, and that the only distinctions existing between *T. scabra* of most former authors, and *T. punctularia* of Daudin, are to be attributed to the difference of age in the specimens described. Mr. Gray indeed states that the former differs *only* from the latter "in the spot on the side of the occiput, not being joined to the superciliary band." I am enabled to negative any importance which might be attached to this very trifling character, by mentioning that in two adult specimens which I have had living, this union of the occipital spot with the superciliary fascia did not exist; and there were several slight differences in the form of the markings on the head, sufficient to show how variable such characters are in different individuals of the same species.

The specific name *scabra* has been given to other species besides that now under consideration. I have already mentioned that the tortoise so named by Retz is *Hydraspis galeata,* and Daudin asserts that those of Gmelin and of Thunberg belong to other species still. The obscurity of the earlier descriptions ofthese animals must render more or less doubtful our attempted elucidations of many of these difficulties; and should certainly lead us to be cautious of giving a decided and dogmatical opinion on disputed synonyms.

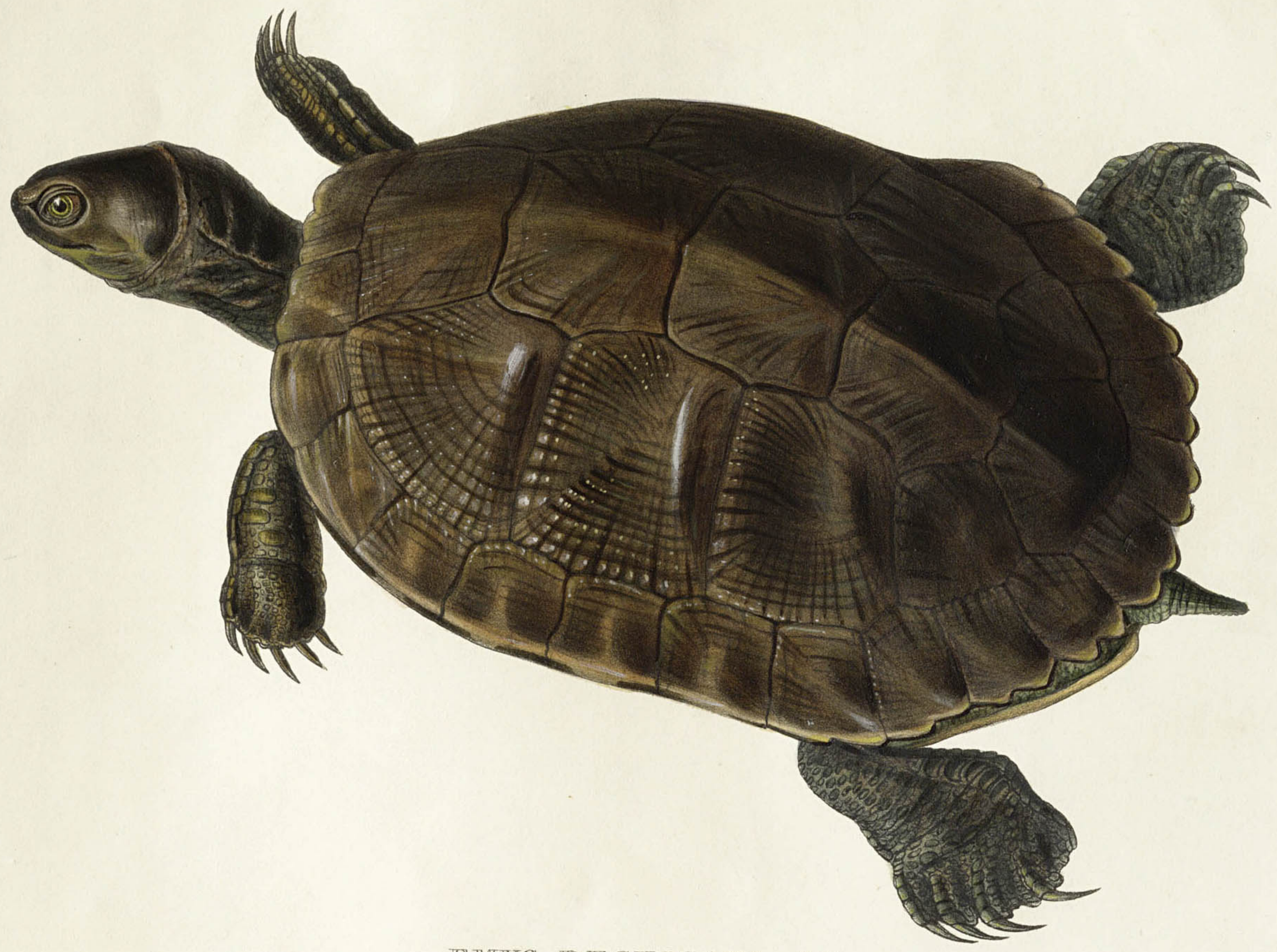
The obscurity has not been lessened in the present instance by the inaccuracy of the habitat assigned to this tortoise by Seba, who terms it "*Testudo terrestris Amboinensis minor*." The increased light which has of late years been thrown upon the geographical distribution of animals, has shown how utterly worthless is the authority of that laborious collector, in all that relates to the countries from which his specimens were said to be derived, and ren-

dered modern authors cautious in quoting him upon such points. Lacépède however, not having the advantage of the more modern discoveries in this important department of natural science, has adopted the error; but, having ascertained that specimens of the same animal had been brought from the new world, he assigns to it the two incompatible habitats of the East Indies and Carolina. The truth is, that it is not only an American species, but in a great measure exclusively an American form.

Notwithstanding the repeated notices which have appeared of the young state of this tortoise, and the numerous figures which have been given of it—three of which however, those of Seba, of Lacépède, and of Spix, can alone be considered as original,—its adult condition has never before been represented. The present Plates are taken from the smaller of two specimens which I had alive, and which I received from Tropical America. The markings on the head are here represented, as they exist in the living animal, of a bright red colour; but soon after death they become paler, and gradually fade to a yellowish white.

Upon the whole I feel satisfied that the list of synonyms which I have given of this species is correct. I have thought it safe to append a note of interrogation to the quotation from Linnæus; and it would be difficult to quote a single instance in the whole of his genus *Testudo*, in which his characters could be considered distinctive. Seba's figure is also a little doubtful; but that of Lacépède is conclusive, as even the peculiar markings on the head are distinctly to be traced. His description is so imperfect, that were it not for the figure, it would be impossible to tell to what species it was intended to refer.

Like all other fluviatile species, this tortoise is carnivorous, feeding on frogs, fish, and any other small animals. The two which I had in my possession fed freely on small pieces of raw meat, but never showed the slightest disposition to bite or snap when teased, differing in this respect from *Emys decussata*, *E. serrata*, and other large American species of the genus. The egg is of a very peculiar form, being a long oval. That from which the figure is taken was found, after death, in the oviduct of the larger of the two specimens mentioned above.



EMYS DECUSSATA. *Bell.*

J. D. C. Sowerby, del. E. Lear lithog. Printed by C. Hullmandel.

EMYS DECUSSATA. *Bell.*

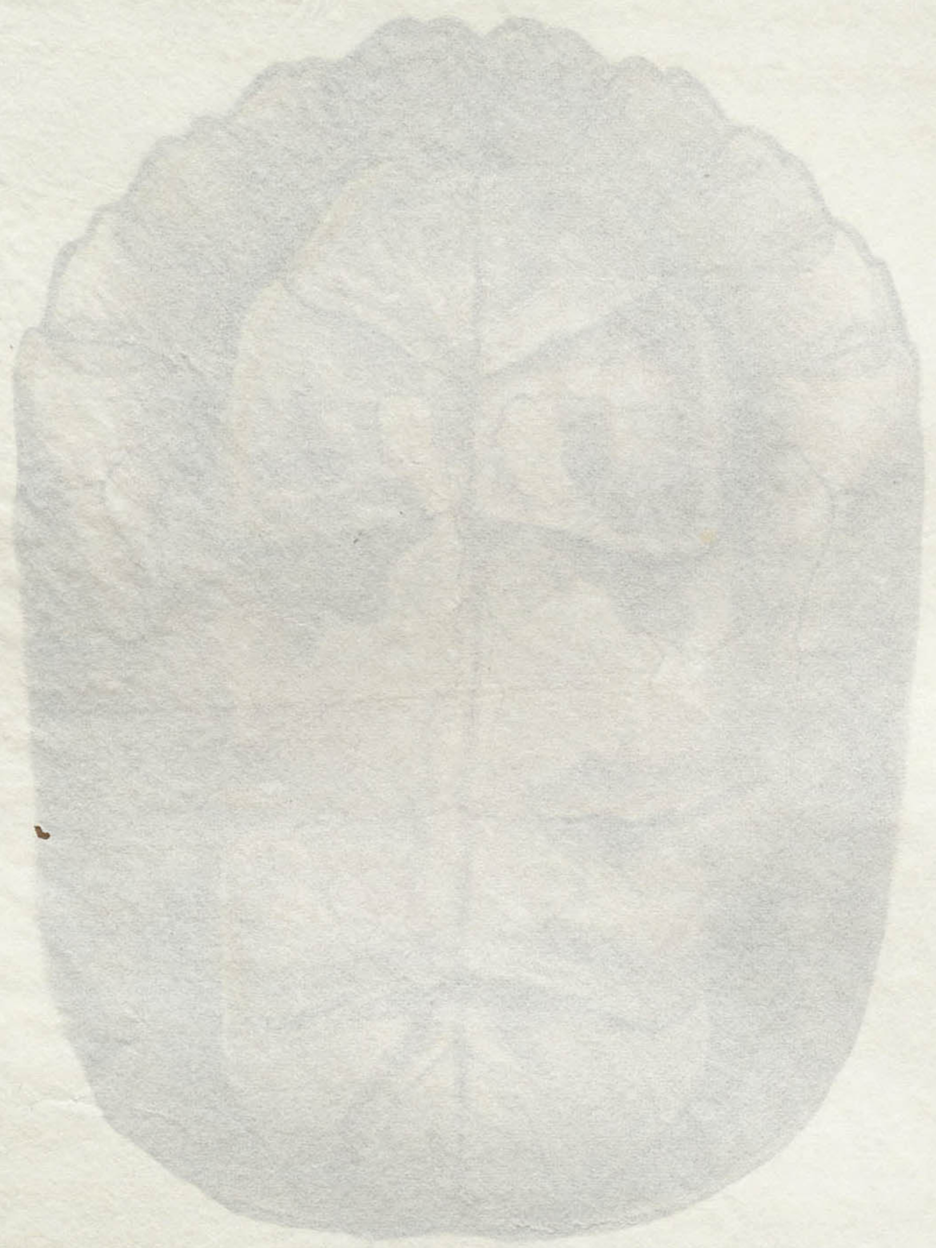
EMYS DECUSSATA, *Bell*.

Testâ suprà pallidè fuscâ, obtusè carinatâ, margine posticè subdentato: scutis rugosis concentricè atque radiatim decussato-sulcatis: scuto vertebrali primo quadrato. Sterno flavescente.

Emys decussata. Bell.—Gray, Syn. Rept. p. 28.—(Icon) Griffith, An. Kingd. tab.—

Habitat in Americâ boreali.
Mus. nostr.

Descriptio. *Caput* subplanum, viridescenti-fuscum, infrà pallidius, lineis maculisque obsoletis, obscurè flavescentibus. *Oculi* flavi, lineâ nigrâ transversè dimidiati. *Collum* pallidè fuscum, lineis longitudinalibus flavis. *Pedes* squamati, olivaceo-fusci, suprà flavo obscurè lineati; *ungues* mediocres, fusci. *Cauda* rugosa, mediocris, conica, fusca. *Testa* pallidè castaneo-fusca, oblongo-ovata, margine posticè dentato, anticè subtruncato; medio elevatiuscula, subcarinata. *Scuta* tuberculoso-rugosa, sulcis ab areolâ usque ad marginem radiantibus, aliis concentricis decussatis: *vertebralia* subelevata, leviter carinata, areolis posticis: primum quadratum, anticè paulò latius; secundum et tertium hexagono-quadrata, vix carinata; quartum hexagonum, posticè angustius, carinatum; quintum triangulare, angulo antico truncato, margine posteriore rotundato: *costalia* rugoso-decussata; primum latum, trilaterale, margine inferiore rotundato; secundum quadratum subgibbosum; tertium secundo minus depressum, quadratum, latere postico breviore; quartum parvum planum, quadratum: *marginalia* omnia quadrata, fusca, maculâ in singulis pallidiore, paria quinque posteriora bidentata: *scutum nuchale* planum, glabrum, lineare. *Sternum* medio planum, ad latera rotundatum, anticè truncatum, posticè emarginatum, flavescens, maculis obsoletis et vix conspicuis, pallidissimè fuscescentibus ad suturas partis inferioris scutorum marginalium, interdum quoque, præcipuè in junioribus, ad partem exteriorem pectoralium atque abdominalium, necnon ad suturas jugulium et humeralium. *Scuta jugula* rectangulo-triangularia, extrorsùm unidentata; *humeralia*



EMYS DECUSSATA, *Bell.*

Testâ suprà pallidè fuscâ, obtusè carinatâ, margine posticè subdentato: scutis rugosis concentricè atque radiatim decussato-sulcatis: scuto vertebrali primo quadrato. Sterno flavescente.

Emys decussata. Bell.—Gray, Syn. Rept. p. 28.—(Icon) Griffith, An. Kingd. tab.—

Habitat in Americâ boreali.
Mus. nostr.

Descriptio. *Caput* subplanum, viridescenti-fuscum, infrà pallidius, lineis maculisque obsoletis, obscurè flavescentibus. *Oculi* flavi, lineâ nigrâ transversè dimidiati. *Collum* pallide fuscum, lineis longitudinalibus flavis. *Pedes* squamati, olivaceo-fusci, suprà flavo obscurè lineati; *ungues* mediocres, fusci. *Cauda* rugosa, mediocris, conica, fusca. *Testa* pallidè castaneo-fusca, oblongo-ovata, margine posticè dentato, anticè subtruncato; medio elevatiuscula, subcarinata. *Scuta* tuberculoso-rugosa, sulcis ab areolâ usque ad marginem radiantibus, aliis concentricis decussatis: *vertebralia* subelevata, leviter carinata, areolis posticis: primum quadratum, anticè paulò latius; secundum et tertium hexagono-quadrata, vix carinata; quartum hexagonum, posticè angustius, carinatum; quintum triangulare, angulo antico truncato, margine posteriore rotundato: *costalia* rugoso-decussata; primum latum, trilaterale, margine inferiore rotundato; secundum quadratum subgibbosum; tertium secundo minùs depressum, quadratum, latere postico breviore; quartum parvum planum, quadratum: *marginalia* omnia quadrata, fusca, maculâ in singulis pallidiore, paria quinque posteriora bidentata: *scutum nuchale* planum, glabrum, lineare. *Sternum* medio planum, ad latera rotundatum, anticè truncatum, posticè emarginatum, flavescens, maculis obsoletis et vix conspicuis, pallidissimè fuscescentibus ad suturas partis inferioris scutorum marginalium, interdum quoque, præcipuè in junioribus, ad partem exteriorem pectoralium atque abdominalium, necnon ad suturas jugulium et humeralium. *Scuta jugalia* rectangulo-triangularia, extrorsùm unidentata; *humeralia*

trapezoidea; *pectoralia* transversa, quadrilatera, margine anteriore extrorsùm sinuata; *abdominalia* magna quadrata, angulo postico-externo truncato, margine anteriore curvo; *femoralia* et *analia* trapezoidea; *axillaria* angustè rhomboidea, anticè et posticè acutè angulata; *inguinalia* majora, triangularia, anticè acuta.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	9	0
Latitudo	6	5
Longitudo sterni	8	3
Altitudo	3	7

Amongst the *Emydes* of North America, the general similarity of which renders it so difficult to distinguish the species by any tangible characters,—a difficulty which is greatly increased by the numerous variations to which most of them are subject,—the present species is one of the most striking, as offering several characters readily appreciated, and sufficient to prevent it from being for a moment mistaken for any other. Whilst in its general form, in the dentated outline of the posterior margin of the shell, in the character of its rugose surface, and even in some of the lines and other markings both of the plates and skin, it partakes of the same general character which belongs to *Emys reticulata, serrata, rugosa, irrigata,* and *ornata,* it is at once distinguishable from them all, by the absence of all regular pattern on the upper shell, the uniform brown colour being interrupted only by a few spots of greater or less intensity of the same hue, or, in young specimens, by a single pale mark on each of the marginal plates. The rugose furrows of the plates are also characterized by a more regular and marked decussation of the concentric and radiating lines: the anterior vertebral plate is *quadrate,* rather broader forwards, whilst in all the others it is more or less panduriform or urceolate.

The pale yellow of the under side is marked, especially in young specimens, by obsolete spots of a greyish brown colour, but so pale as to be only just visible. Of these the most constant are found on the sutures of the marginal plates, on the axillary and inguinal, and on the suture between the gular and

humeral. In older individuals they entirely disappear, and the sternum sometimes becomes irregularly clouded with brown.

Few species of the genus have been more frequently offered to me for purchase than this; and it is strange that it should have remained so long undescribed. I have possessed many of them living, and have had as good an opportunity of observing their habits as the change of their condition would permit. They are voracious, like their congeners, tearing in pieces and greedily devouring meat, frogs, small fish, or any other food of this kind. On being teazed, they snap at any object held near them with considerable quickness and force. One of this species which I kept some years since, exhibited a peculiarity in the manner in which it took its food, which does not appear to belong to the species generally. On a portion of meat being presented to it in the water, its fore legs were stretched out directly forwards, the palms being placed outwards, and the feet were then agitated with a sort of vibratory motion, during which the head was suddenly darted out to seize the prey.

I have not been able to ascertain from what part of America my specimens were brought; but I have reason to conclude that they are found in various parts of the United States.

EMYDA PUNCTATA.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

EMYDA PUNCTATA.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

EMYDA PUNCTATA, *Gray.*

Habitat in India orientali.

Mus. nostr.—Mus. Brit.

EMYDA PUNCTATA, *Gray.*

Cute obscurè viridescente, albido punctatâ, capite colloque luteo maculatis; sterni callis septem.

Testudo punctata. (*La chagrinée.*) Lacep. Quad. Ovip. p. 171. t. xi.—Bonat. Erpet. p. 30.
Die chagrinirte. Schneid. Schildkr. 2. Beytrag. p. 22. fig.
Testudo scabra. (*La Tortue chagrinée.*) Latr. Rept. i. 164.
T. granosa. Schœpff, Hist. Test. t. xxx. A. t. xxx. B. p. 127.
T. granulata. Shaw, Gen. Zool. iii. t. 14. p. 68.—Daud. Rept. ii. p. 81.
Trionyx coromandelicus. Geoff. Ann. Mus. xiv. p. 16. t. v. f. 1.—Merr. Amph. p. 20.
Trionyx granosus. Schweig. Prod. sp. 6.—Wagler, Amph. p. 134.
Emyda punctata. Gray, Syn. Rept. p. 49.

Habitat in Indiâ orientali.
Mus. nostr.—Mus. Brit.

Descriptio. *Caput* robustum, depressum; suprà olivaceum, maculis oblongis luteis, infrà sordidè albidum. *Nasum* depressiusculum, brevitèr porrectum, truncatum. *Nares* terminales, ovatæ. *Labia* tenuia, angusta. *Oculi* magni, iridibus nigricantibus. *Collum* longum, sed brevius quàm in plurimis hujus familiæ speciebus, rugosum, suprà fuscum, flavo maculatum ; infrà pallidius. *Pedes* palmati, olivaceo-fusci, cute laxâ, plicatâ; anteriores digitis quatuor, posteriores quinque; omnes unguibus tribus, brevibus, fuscis armati. *Cauda* exserta, brevissima, obtusè conica, fusca. *Dorsum* ovatum, levitèr convexum, non carinatum, pallidè olivaceum, maculis obscuris, rotundis, sparsis, flavescentibus ornatum; margine posteriori ossiculis plurimis, planis, punctatis, anterioribus majoribus, à disco osseo paulò distantibus sustento. *Discus osseus* integer, ovalis, posticè angustatus, omninò granulato-punctatis.

Os nuchale, in junioribus separatum, denique cum testâ dorsali unitum. *Sternum* latum, planum, albidum, ex ossibus septem callosis constans; *calli* granulato-punctati; anteriores ovato-subreniformes; impar rotundus; laterales irregulares, magni, extrorsùm ad marginem dorsi attinentes; posteriores rhomboidei, in adultis conjuncti. Apertura posterior inter testam dorsalem et sternum, lobis binis coriaceis clausa.

Mensura Corporis.

	ped.	unc.	lin.
Longitudo totalis (collo porrecto)	1	2	4
——— corporis	0	8	4
Latitudo	0	6	5
Longitudo sterni	0	7	0
Altitudo	0	3	0

The separation of the genus *Emyda* from the rest of the *Trionychidæ* is too obviously natural to require any laboured defence. It appears to have been made by Dr. Wagler and Mr. Gray about the same time, though the former has the advantage in priority of publication. Notwithstanding this, however, as Dr. Wagler has applied the name of *Trionyx* to this genus, giving that of *Aspidonectes* to the remainder of the family, I prefer retaining, with Mr. Gray, the name of *Trionyx* for the typical form, and giving a new appellation to the present genus, which must be considered as an abnormal form, and which consists of but one known species.

The characters by which it is distinguished from all others of the *Trionychidæ* are very striking. The osseous disk occupies, in the adult, almost the whole area of the back, reaching from the anterior margin nearly to the posterior, and entirely from one side to the other. The ribs are united through their whole length, before the animal has nearly attained his full size. The posterior margin is strengthened and supported by a series of bones unconnected with the disk: there are generally about 10 or 12 pairs, but several of them become united as the animal grows older. The sternum occupies a much more considerable space than in any other of the family; and the calli, which are seven in number, are of considerable size, almost touching each other. Another

remarkable peculiarity is that the anterior opening of the shell is capable of being partly closed by the motion of the anterior pair of sternal bones, and the posterior opening of being completely shut by two coriaceous lobes or valves arising from the posterior margin of the last two bones of the sternum.

The nuchal bone in this species is early united to the dorsal shell: it is small and of an oval or semilunar figure. The anterior pair of ribs are broader than the succeeding ones, expanding towards the margin: the posterior also are broad and short. The total number of ribs varies from six to nine pairs in the specimens which I have observed. The surface of the bone, both on the back and sternum, is not rugose as in many species of *Trionyx*, but scabrous, with numerous elevated round points, distributed pretty equally over the whole. The tail is extremely short, more so even than in *Trionyx labiatus*; but as there is no flap of skin extending behind the margin of the bony shell, it still projects a little beyond the edge of the dorsum.

There is no doubt that the habits of this animal resemble in a great measure those of the other species of the family, though there may probably be some approach to those of the *Emydidæ*, consonant with the marked approximation which we observe in its form and structure. Thus, it has not the extremely depressed form, and the soft, flattened and expanded margin, by which the *Trionyx* has the power of so readily concealing itself in the mud, and therefore probably roams after its prey more in the manner of the other fluviatile groups.

The structure of this animal is so interesting, as being evidently abnormal, that it will not perhaps be wholly unavailing to examine what are its relations to other groups, and to which of them it may be considered as constituting the annectant form. Mr. Gray has placed it at the end of the *Trionychidæ*, next to *Sphargis* of the *Cheloniadæ*. The characters of the latter genus, however, evince a much nearer affinity to *Trionyx* than to *Emyda*; as the sternum is almost wholly cartilaginous, and the ribs are not connected with the sternum, and are much less extensively ossified than in any other genus. On the other hand, we shall discover in *Emyda* many important points of affinity to the other fresh-water groups. Passing from *Trionyx*, the typical form of this family, towards the *Hydraspidæ*, we see in the present species a marked

approach to that group, in the increased extent of the sternum, in the union and consolidation of the ribs throughout their whole length, and in the marginal bones. Besides these obvious affinities in the osseous structure, the power which the animal possesses of retracting and concealing its posterior extremities constitutes another marked approach to the group in question. Here, then, it is met by the genus *Chelys*, in which we observe the prominent, cylindrical and soft rostrum, the long flexile neck, the inability to enter wholly within the shell, and other characters which in a higher degree characterize the *Trionychidæ*.

Of this species I have received several specimens from India, all of which had been long preserved in spirits; and it is probable that the colour of the specimen from which the present figures were taken was considerably changed.

J. D. C. Sowerby del. E. Lear lithog.

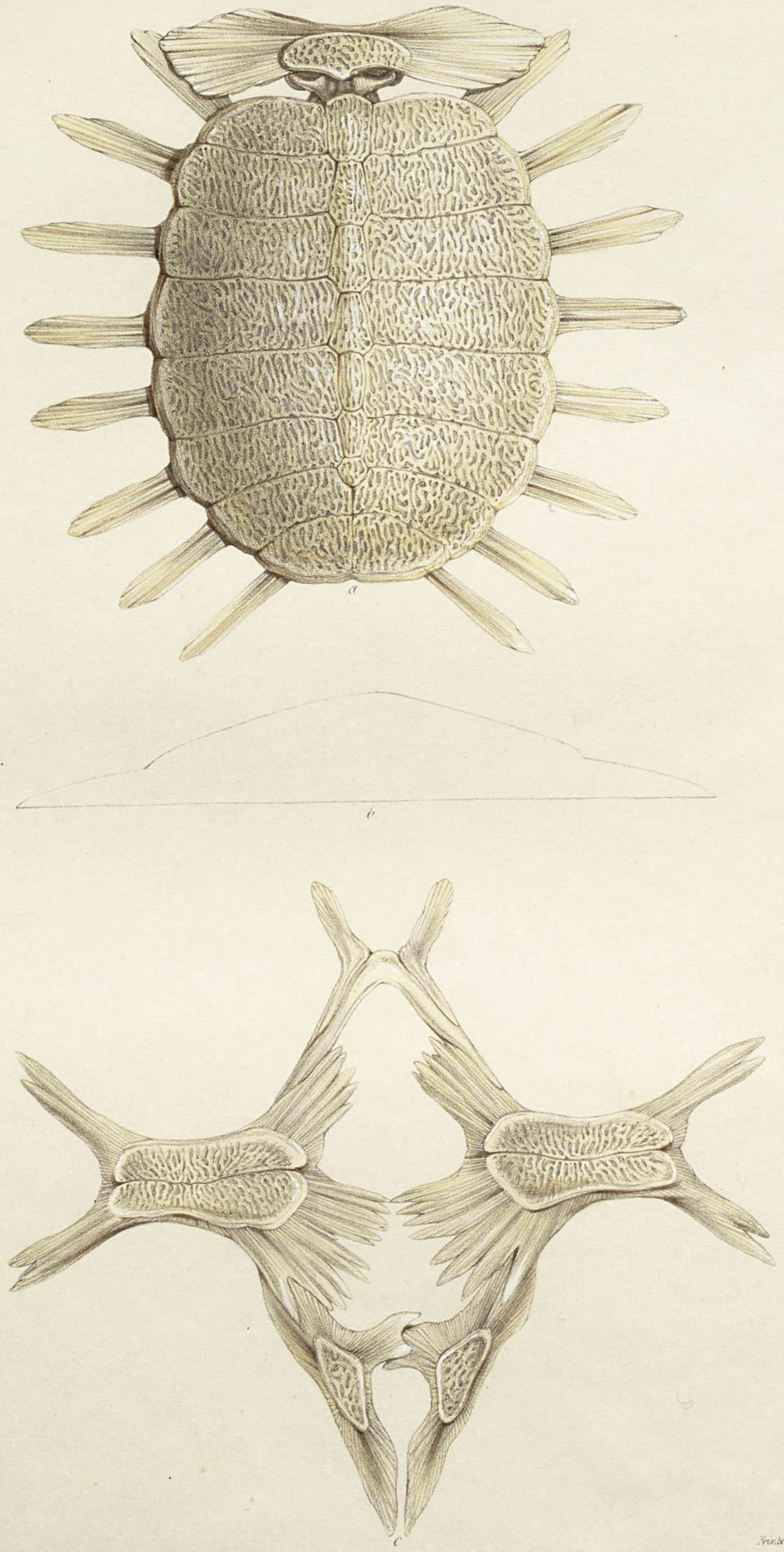
TRIONYX LABIATUS, n. s.

Printed by C. Hullmandel.

TRIONYX LABIATUS, n. s.

J. D. C. Sowerby del. Ed. Lear lithog.

Printed by C. Hullmandel.



Jane S. Bell del. E. Lear lithog.

Printed by C. Hullmandel.

TRIONYX LABIATUS.

⅔ Long. Nat.

a. Dorsum. b. Transverse elevation of Dorsum. c. Sternum.

TRIONYX LABIATUS.

Habitat in Africa occidentali, apud Sierra Leone.

TRIONYX LABIATUS, *n. s.*

Suprà olivaceus, flavo maculatus: labiis dilatatis: caudâ brevissimâ, obtectâ; osse nuchali separato; callis sterni quatuor, posterioribus trigonis distantibus; sterni appendicibus anticis divergentibus.

Habitat in Africâ occidentali, apud Sierra Leone.

Mus. nostr.

Descriptio. *Caput* elongatum, fusco-olivaceum, punctis rotundis, numerosis, flavis. *Nasum* subcylindricum, elongatum, truncatum. *Nares* terminales. *Labia* lata, subpendula. *Oculi* parvi. *Collum* longissimum, olivaceo-fuscum, flavo maculatum, subtùs pallidius. *Pedes* robusti, suprà olivacei, maculis sparsis flavescentibus; infrà albidi, palmis plantisque nigricantibus, flavo obsoletè maculatis. *Ungues* mediocres, curvi, subacuti, quorum interior maximus. *Cauda* alba, brevissima, conica, acuta, sub margine posteriori corporis obtecta. *Corpus* ovatum, depressum, non carinatum; suprà olivaceum, punctis numerosissimis, et maculis majoribus paucis, flavis; infrà album, ad marginem posteriorem fuscum, albido maculatum. *Calli sternales* quatuor, pallidè cœrulei, quorum anteriores transversè oblongi, introrsùm vix latiores: posteriores elongato-triangulares, distantes.

Testa ossea dorsalis ovalis, rugosa; *costarum* parte liberâ partem conglutinatam longitudine ferè æquante. *Os nuchale*, seu vertebra prima separata, latissima, callo transversè oblongo, subreniformi. *Sterni* rami antici divergentes. *Calli* sinuato-rugosi, anteriores magni, quadrato-oblongi; posteriores elongato-trigoni.

Mensura Corporis adhuc vivi.

	ped.	unc.	lin.
Longitudo totalis (collo porrecto)	1	5	5
——— colli cum capite	0	7	3
——— corporis	0	10	0
Latitudo	0	8	0
Altitudo	0	2	0

Testæ osseæ mensura.

	unc.	lin.
Testæ dorsalis longitudo	6	6
———— latitudo	6	4
Sterni longitudo	6	4
—— latitudo	7	4

Of this beautiful and hitherto undescribed species of *Trionyx*, I obtained some time since a living specimen which had been brought from Sierra Leone. I was at first doubtful whether it might not be considered as a variety of *Tr. ægyptiacus*, as the form and the markings have considerable resemblance, although the colours differ materially. The situation and form of the sternal callosities are also, in a great measure, similar. Having had drawings made from the upper and under sides during life, I determined on sacrificing the soft parts after death, for the sake of obtaining a perfect skeleton; and I then found that the characters of the bony shell exhibited the most marked differences from the species above alluded to, and indeed from all others. Independently, then, of the distinctions in the colour of the skin, we find that the first dorsal vertebra, or, as Mr. Gray has very well named it, the *os nuchale*, is separated from the bony shell, in which respect it differs from *Tr. ægyptiacus* and *Tr. javanicus*; from both of which also, as well as from *Tr. subplanus*, it is readily distinguished by the extent of the free portion of the ribs, which is nearly equal in length to the connected part which forms the solid shell. From the osseous parts of *Tr. carinatus*, as figured by Geoffroy, its distinction is not at first sight so obvious; but, upon examination, it will be found that even the bony shell affords sufficient characters to show that it is specifically distinct. The callous portion of the *os nuchale* is proportionally much longer and larger in the present species. The anterior calli of the sternum in *Tr. carinatus* are nearly half as broad again at the inner part as at the outer; in *Tr. labiatus* they are nearly of the same breadth throughout. The toothed margins of the sternal bones are also much more divided, as well as very differently formed in the latter. But in the character from which the approximating species has

been named [illegible] striking [illegible] having any [illegible] *labiatus* [illegible] depressed [illegible] independent [illegible] not exceeding one sixth [illegible] and a quarter.

[illegible] good health and very active when I received [illegible] time and have [illegible] more desirable, as it was the [illegible] having been brought [illegible] this country died however [illegible] had kept [illegible] few weeks and [illegible] had been unable to get [illegible] suddenly and [illegible] the mouth. On being placed in a large [illegible] bottom [illegible] remained [illegible] came to the [illegible] was [illegible] and extended [illegible] was [illegible] mentioned [illegible] whence he had [illegible] shells of which were broken into small angular fragments, though still covering the animals [illegible] to the man [illegible] would appear to indicate that these animals [illegible] found stationary or nearly so at the bottom of [illegible] fresh water [illegible] consists of [illegible] and even the [illegible] birds.

TERRAPENE CLAUSA.

J. D. C. Sowerby del. E. Lear lithog. *Printed by C. Hullmandel.*

TERRAPENE CLAUSA, *Merrem.*

Testa subglobosa ovato-rotunda, carinatâ, fuscâ, luteo variegatâ; [illegible]; caudâ brevi; capite pedibusque luteo et aurantio maculatis.

Grew, Mus. Soc. Reg. p. 38. t. iii. f. 2.

? *Testudo Carolina.* Linn. Syst. Nat. i. p. 353.—Gmel. Syst. Nat. i. p. 1041.

T. carolina. Latr. Rept. i. p. [illegible].—Daud. Rept. ii. p. 207. t. xxiii. f. 1, 2.—Schoepff. Schildkr. p. [illegible]

T. clausa. Gmel. Syst. Nat. i. p. 1042. sp. [illegible] in Schrift. Berl. Naturf. [illegible]—Lacép. Rept. i. p. 130.—Daud. Rept. ii. p. [illegible] f. [illegible].—Shaw, Gen. Zool. iii. p. [illegible]

T. incarcerata. Bonat. Erp. p. 30.

T. incarcerato-striata. Bonat. l. c.

Emys clausa. Schweig. Prodr. sp. [illegible]—Bory, [illegible] p. 162.—Wagler, Amph. 138.

Terrapene clausa. Merr. Amph. p. [illegible]—Bell, Zool. Journ. [illegible]

Ter. carolina. Bell, Zool. Journ. [illegible]

Cistuda clausa. Say, Journ. Acad. Philadelphia [illegible] p. 214. sp. 11.

C. carolina. Gray, Syn. Rept. p. 18.

La tortue à boîte. Bosc, Nouv. Dict. d'Hist. Nat. [illegible] p. 265.

La bombée,—la tortue à boîte. Lacép. Quad. Ovip. i. pp. 164, 169.

Land tortoise from Carolina. Edwards, Nat. Hist. p. 205.

Chequered tortoise. Pennant, Arct. Zool. ii. p. 328.

Die dosen Schildkröte. Bloch, Schrift. Berl. Naturf. vii. p. 131. t. i. viii. p. 18.

var. α. testâ ovatâ, luteo fuscoque nebulosâ.

Terrapene nebulosa. Bell, Zool. Journ. ii. p. 310. sp. 3.

TERRAPENE CLAUSA, *Merrem.*

Testâ subglobosâ ovato-rotundâ, carinatâ, fuscâ, luteo variegatâ; rostro adunco; caudâ brevi; capite pedibusque luteo et aurantio maculatis.

Grew, Mus. Soc. Reg. p. 38. t. iii. f. 2.

? *Testudo carolina.* Linn. Syst. Nat. I. p. 352.—Gmel. Syst. Nat. I. p. 1041.

T. carolina. Latr. Rept. I. p. 372.—Daud. Rept. II. p. 207. t. xxiii. f. 1. 2.—Schneid. Schildkr. p. 334. sp. 7.

T. clausa. Gmel. Syst. Nat. I. p. 1042. sp. 25.—Schneid. in Schrift. Berl. Naturf. x. 270.—Schœpff, Test. p. 32. t. vii.—Latr. Rept. I. p. 139.—Daud. Rept. II. p. 207. t. xxiii. f. 1. 2.—Shaw, Gen. Zool. III. p. 36. t. vii.—Leconte, Ann. Lyc. N. Y. III. p. 124. sp. 15.

T. incarcerata. Bonat. Erp. p. 29.

T. incarcerato-striata. Bonat. l. c.

Emys clausa. Schweig. Prod. sp. 42.—Bonap. Test. Eur. et Amer. Bor. p. 162.—Wagler, Amph. 138.

Terrapene clausa. Merr. Amph. p. 28.—Fitzing. Rept. p. 44.

Ter. carolina. Bell, Zool. Journ. II. p. 309. sp. 2.

Cistuda clausa. Say, Journ. Acad. Philadelph. IV. pp. 205, 214. sp. 11.

C. carolina. Gray, Syn. Rept. p. 18.

La tortue à boîte. Bosc, Nouv. Dict. d'Hist. Nat. XXII. p. 265.

La bombée,—la tortue à boîte. Lacép. Quad. Ovip. I. pp. 164, 169.

Land tortoise from Carolina. Edwards, Nat. Hist. p. 205.

Chequered tortoise. Pennant, Arct. Zool. II. p. 328.

Die dosen Schildkröte. Bloch, Schrift. Berl. Naturf. VII. p. 131. t. i. VIII. p. 18.

var. α. testâ ovatâ, fusco flavoque nebulosâ.

Terrapene nebulosa. Bell, Zool. Journ. II. p. 310. sp. 3.

var. β. testâ globosâ, nigrâ, guttis maculisque flavescentibus.

Testudo virgulata. Latr. Rept. I. p. 100. et icon.—Daud. Rept. II. p. 201. t. xxiii. f. 3, 4.

Emys virgulata. Schweig. Prod. sp. 43.—Wagler, Amph. p. 138.

Terrapene virgulata. Fitzing. Rept. 44.

Ter. maculata. Bell, Zool. Journ. II. p. 309. sp. 2.

Habitat in Americâ septentrionali.

Mus. nostr.—Mus. Brit. &c.—α et β in Mus. nostr.

Descriptio. *Caput* magnum, suprà planum, scutatum, fuscum, aurantio, luteo vel flavo variegatum. *Maxilla* superior undulata, apice uncinato. *Oculi* magni, fusci. *Collum* rugosum, squamosum, suprà fuscum, ad latera et infrà luteum, fusco maculatum. *Pedes anteriores* crassi, subclavati, squamis rotundis, aurantiis vel flavis tecti; unguibus parvis, brevibus, cinereis. *Pedes posteriores* rugoso-squamosi, luteo-aurantii; unguibus acutis, elongatis, quorum secundus reliquis longior. *Cauda* brevis, squamosa. *Testa* ovata, vel ovato-rotunda, elevata, subglobosa, margine subintegro, anticè leviter emarginato, posticè revoluto, lateribus rotundatis; fusca, vel fusco-nigra, maculis flavis vel luteis, plùs minùs distinctis, variegata. *Scuta dorsalia* glabra, obsoletè sulcata: *vertebralia* plana, carinata, areolis subposticis; primum pentagonum, margine undulato; secundum et tertium lata, hexagona; quartum hexagonum, posticè angustius; quintum irregulariter hexagonum, posticè latius: *costalia* rotundata, convexa; primum trigono-trapezoideum; secundum et tertium pentagona; quartum parvum, quadratum: *marginalia* omnia ferè quadrata, areolis posticis; posteriora et interdùm lateralia revoluta: *caudalia* declivia, quadrata: *scutum nuchale* minimum. *Sternum* latum, planum, margine integerrimo, flavum, nigro maculatum vel nebulosum, in nonnullis omninò fuscum, vel nigrum: *scuta jugalia* triangularia, posticè acuta: *humeralia* quadrilatera, extrorsùm latiora, rotundata, introrsùm angustiora: *pectoralia* et *abdominalia* quadrilatera, transversè oblonga: *femoralia* subtriangularia, sed angulo interiore truncato; *analia* trigona, margine posteriore rotundato.

In lobos duos inæquales dividitur sternum; quorum anterior minor, et, testâ clausâ, sursùm reflexus; posterior planus; lobi cardine membranaceo-cartilagineo, inter scuta pectoralia et abdominalia, connexi. Margo integer sterni ad marginem inferiorem testæ accuratè applicari potest; ita ut animal, intra testam retractum, tutissimè et ex omni parte includatur.

Testæ osseæ mensura.

	Var. α. unc.	Var. α. lin.		Var β. unc.	Var β. lin.
Longitudo dorsi	5	5	. . .	4	6
Latitudo ejusdem	4	1	. . .	4	0
Longitudo sterni	5	3	. . .	4	6
Altitudo	2	3	. . .	2	3

There is perhaps scarcely another species of Tortoise so liable to variation as this, whether in colour, in marking, or in form. From the comparison of only a few specimens, I some years ago described three of the most remarkable varieties as distinct species; but the possession of numerous individuals, several of which I have had the opportunity of observing whilst alive, has enabled me to ascertain that they all belong to one species. The common, and, as it may be termed, normal form is intermediate between the two extremes, which I then termed respectively *nebulosa* and *maculata.*

The shell is ovate, somewhat broader behind, and considerably elevated; more so, in proportion, than any other species of the genus, and, consequently, than any other of the family of the *Emydidæ:* the vertebral plates have an obtuse longitudinal carina; the dorsal ones are somewhat convex and rounded; the margin is revolute, particularly over the thighs. The scuta are slightly sulcated, and of a dark brown or blackish colour, with large yellow spots and splotches, which assume somewhat of a radiating and circular direction around the areolæ, though not in any very marked degree. The sternum is in some specimens wholly yellow, excepting a few black or brown spots; in others it is beautifully mottled or clouded with black and yellow, pretty equally distributed; and in others, as in that from which the present figure is taken, it is almost wholly of a rich blackish brown colour. The margin of the sternum is very entire, and closes the shell accurately when the lobes are raised. The skin of the animal is marked with similar colours to those of the shell, the yellow predominating in some individuals, and the black in others. In one specimen in my possession, the whole of the lateral and under part of the head and neck

is yellow, excepting a few small black spots. The feet and tail vary equally with the other parts, and I have sometimes seen them, as well as the neck, almost entirely of a rich bright scarlet colour.

The head is large and broad, the upper jaw strong and hooked at the point, but without a denticulated margin; the eyes are large and prominent; the feet are more club-shaped than in any other species of the family, and consequently less adapted for swimming; the tail is very small, but sufficiently conspicuous to prove that it must have been from a mutilated specimen that Linnæus gave the character of "caudâ nullâ."

The first variety, *nebulosa*, differs from the normal character in the more oblong form of the shell, but especially in the very indistinct and clouded character of the markings: the second, *maculata*, which is also *Testudo virgulata* of Daudin, differs in the almost globular form of the shell—which is nearly as broad as it is long,—and in the spots being of a light yellow, and having a distinct outline upon an uniform black ground. I have now twelve specimens of the different varieties before me; and, were the two extremes to be examined without any intervening ones, it would be impossible not to consider these as distinct; the intermediate variations both of form and colour are, however, sufficient at once to show that they all belong to one species.

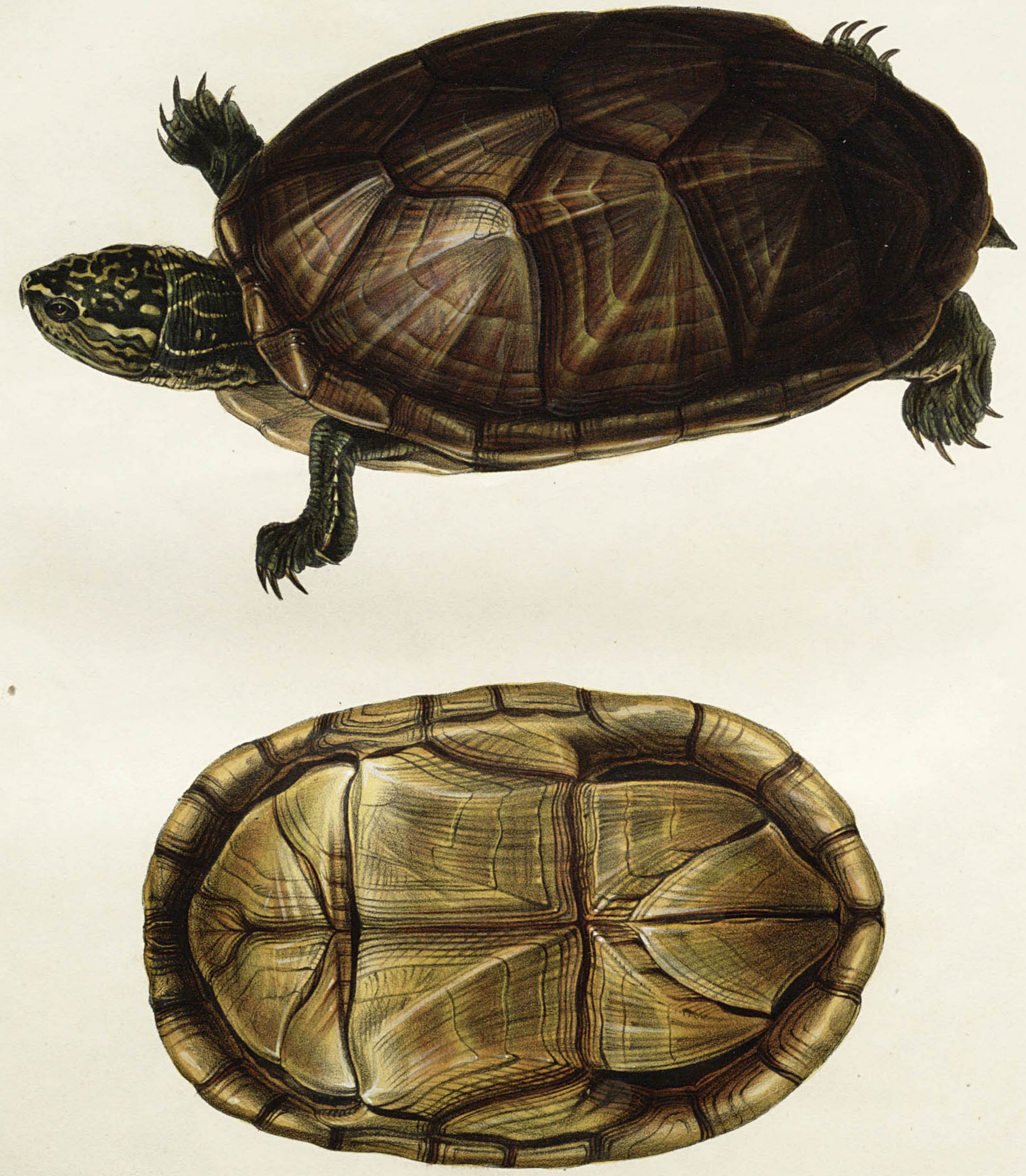
In the elevated form of the shell, and the thick clubbed feet, this species bears an evident relation to the family of the *Testudinidæ;* an approximation which is equally borne out by its habits; for we learn that although it is occasionally found in marshy places, it never seeks the water, and that it even frequents the driest and hottest situations. Its food also, although partly derived, as in the rest of the *Emydidæ*, from the animal kingdom,—as beetles, snails, small mice, or even serpents,—consists also of various kinds of vegetables. In the account of this genus, I have stated at length the grounds upon which I have considered it as closely approximating to the terrestrial forms; and I may here observe that the present species possesses those characters in a higher degree than any other of the genus.

A few synonyms which have been erroneously given as belonging to this species, require to be corrected. "La courte-queue" of Lacépède has almost always been considered as identical with *Terrapene clausa*; but this author

says that a specimen of the shell in the Paris Museum is ten inches and six lines in length, and nearly nine inches broad; dimensions which are fully double those of the present species. The description is in other respects so slight as to afford no clue to the species intended, so that there really appears to be no reason for even believing it to be a box tortoise at all. The Prince of Musignano, in his "Osservazioni sulla Seconda Edizione del Regno Animale" identifies my *Terrapene bicolor* with this; it is however, in fact, *T. amboinensis*. The species called "La tortue noirâtre" and *Testudo nigricans* by different authors, is also given by the Prince in his list of the synonyms of this species; whereas it is a *Sternothærus*, and probably identical with my *St. Leachianus*. Mr. Gray has quoted as a synonym "*Terrapene guttata* Bell"; but as I never applied such a name to any species, I presume that author intended "*T. maculata*."

We are informed that *Terrapene clausa* inhabits North America from Hudson's Bay to the Gulf of Florida*. It prefers dry situations, living principally in mountains, woods and pine forests. It is eaten, though its flesh is but little esteemed; but its eggs, which are of the size of a pigeon's, are said to be delicious. Its food, as has been before observed, is various, and partakes of the nature of the land and fresh-water families. It is stated that it may be made useful in gardens, by destroying snails and small mice. It has been known to live forty-six years, according to the authority of Muhlenberg, as quoted by Daudin.

* Ch. Bonaparte, l. c.



KINOSTERNON SCORPIOIDES.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

KINOSTERNON SCORPIOIDES.

KINOSTERNON SCORPIOIDES.

Testâ tricarinatâ, scutis vertebralibus elongatis, subimbricatis.

Testudo scorpioides. Linn. Syst. Nat. I. 352.—Daubent. Enc. Méth.—Lacép. Quad. Ovip. 133.—Latr. Rept. I. p. 19.
T. tricarinata. Daud. Rept. II. p. 178.
T. (Chersine) scorpioides. Merrem, Amph. 33.
T. pensylvanica, var. Shaw, Gen. Zool. III. pt. 1. t. 15. p. 61.
Emys scorpioidea. Schweig. sp. 35.
Kinosternon longicaudatum. Spix, Rept. Braz. t. xii. p. 17.—Bell, Zool. Journ. II. p. 304.
? *K. brevicaudatum.* Spix, l. c. t. xiii.—Bell, l. c. p. 304.
K. Shavianum. Bell, Zool. Journ. l. c.
Cinosternon scorpioides. Wagler, Amph. p. 137.
Kinosternon scorpioides. Gray, Syn. Rept. p. 34.
Junior. *Testudo tricarinata.* Schœpff, Hist. Test. t. ii. p. 9.—Latr. Hist. Rept. I. p. 118.—Shaw, Gen. Zool. III. p. 54. t. xi.
Testudo Retzii. Daud. l. c. p. 174.
Emys Retzii. Schweig. sp. 34.
Terrapene tricarinata. Merr. Amph. p. 28.

Habitat in Americâ meridionali.—In Mexico, Braziliâ, Surinamo, Guianâ; ad ripas fluminum.
Mus. nostr.—Mus. Brit., &c.

Descriptio. *Caput* ovatum, posticè latum, subdepressum, olivaceum, flavo virgillatum. *Maxillæ* denticulatæ, aduncæ, margine subsinuato. *Collum* olivaceo-fuscum, lineis flavis confluentibus, longitudinalibus. *Gula* cirrhis quatuor parvis armata, cinerascens. *Pedes* fusco-virides, squamati. *Ungues* breves, falciformes, acuti. *Cauda* crassa, conica, maris (?) brevis; fœminæ (?) longior, in nonnullis ungue corneo terminata,

fusca. *Testa* fusco-badia, oblonga, convexa, tricarinata, à carinis ad marginem medio rotundata, posticè subplanè declivis : margine ferè integro. *Scuta dorsalia* subsulcata, et radiatìm striata, areolis ad angulos posticos positis, punctatis : *vertebralia* omnia subimbricata, elongata, canaliculata, medio acutè carinata ; primum triangulare, posticè truncatum ; secundum et tertium elongato-hexagona ; quartum hexagonum, sinuosè marginatum, alatum; quintum quadrilaterum, anticè angustatum, posticè latum, margine postico rotundato : *costalia* convexa, suprà acutè carinata, areolis posticis ; primum trigono-trapezoideum, margine inferiore rotundato ; secundum et tertium rectangula, convexa ; quartum pentagonum, irregulare, subgibbosum : *marginalia* viginti tria, quadrilatera ; anteriora subhorizontalia ; lateralia verticalia ; posteriora latiora, declivia. *Scutum nuchale* breve, quadratum. *Sternum* fulvo-badium vel flavicans, oblongum, anticè rotundatum, marginem interiorem testæ ferè adæquans, posticè subacutum, angustatum, subemarginatum, à testæ margine paululò distans ; lobi anterior et posterior membranâ articulati, mobiles ; medius solidus, fixus, scutis abdominalibus tectus. *Scuta sterni* undecim, subdecussato-striata; *gulare* impar, cordatum, margine sinuato ; *humeralia* quadrilatera, trapezoidea; *pectoralia* quadrilatera, intùs attenuata ; *abdominalia* magna, subquadrata, rectangula ; *femoralia* elongata, posticè acuminata ; *analia* trigona, anticè acuminata ; *axillaria* et *inguinalia* longa, angusta, sternum à dorso omninò separantia.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	6	0
Latitudo ejusdem	4	7
Longitudo sterni	5	2
Altitudo	2	2

This species, not only the most elegant of the genus, but one of the most so of the whole order, was first made known by Linnæus, under the specific name which it still retains. The specific character which he has assigned to it—" fronte callo trilobo "—is one which I have reason to believe was a purely accidental circumstance in the specimen described by him ; as in the living one which I had in my possession, and from which the present figures are taken, there was no appearance of any such appendage, nor is it either represented

or described by Spix, in his work on the Tortoises of Brazil, in which the present species is twice figured and described. The error, however, like many others sanctioned by such authority, has been perpetuated by subsequent writers, as Lacépède, Latreille, Daudin, and Merrem. The name *scorpioides* was given to it from a character which is certainly not constant, namely, the existence of a horny claw terminating the tail. In Spix's figure of *Kinosternon longicaudatum*, which is certainly the present species, such a claw exists, and the tail is of considerable length ; in the specimen from which our drawing was made, as well as in *K. brevicaudatum* of Spix, the tail is short, conical, and has no terminal nail or spine. A similar variety occurs in *Testudo indica, T. græca, T. marginata,* and other species, some individuals of which have longer tails with the terminal claw, and others very short ones without such an appendage. It has been observed by Lacépède that adult animals only have it. Whether it be a distinction appertaining to sex is as yet undetermined ; but it is most probable that it belongs to the female, from the circumstance of its existing only at the extremity of a tail much longer than those in the same species which have no such appendage, and the consequent removal of the opening of the cloaca to some extent from the margin of the shell. The object of this length of tail in the female, would be to allow of a considerable extension of the cloaca, and thus to afford a greater facility for the passage of the egg.

The true structure of this tortoise was first understood by Daudin, who places it in his subdivision of "Tortues à boîte." Lacépède had previously considered it as belonging to the fresh-water group, and appears surprised at one of that division having a spine at the tail. Merrem however, having overlooked this arrangement of Daudin, probably in consequence of that author having altered the name to *tricarinata*, considers it as a land tortoise, and places it in his subgenus *Chersine*. *Testudo tricarinata* of Schœpff is undoubtedly the young of this species. I have a specimen a little larger than his figure ; it is of a bright chestnut colour, and has the three dorsal carinæ very distinctly marked.

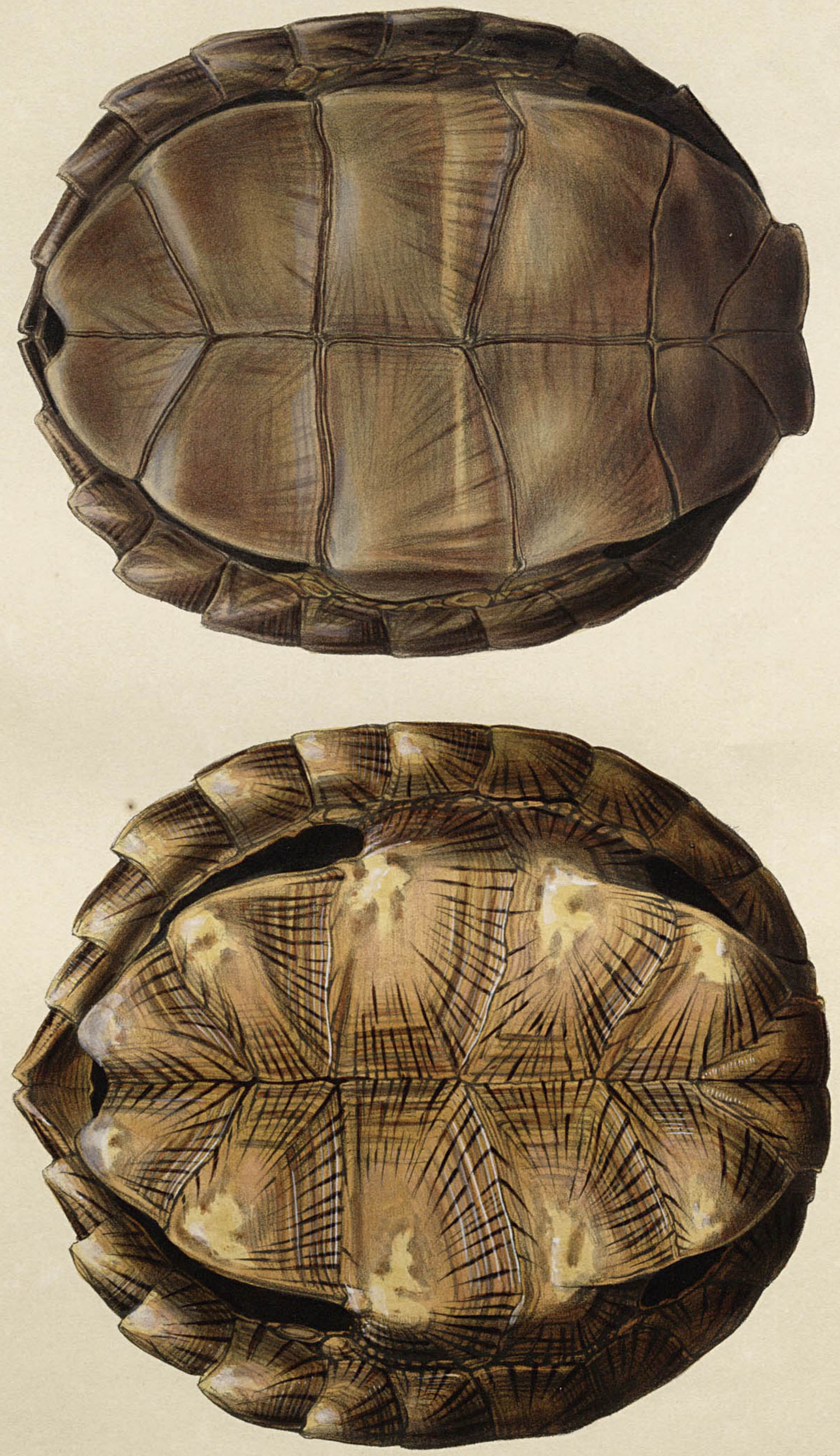
In the General Zoology, Shaw has figured and described a specimen of this species, as a variety of *T. pensylvanica*, in which, as in one in my possession,

the vertebral plates are much elongated and of the most elegant forms: the colour in this specimen is much darker than usual, the sculpture of the scuta more distinct and perfect, and the carinæ nearer together. In the Zoological Journal of 1825, I described it, (not having then seen any other example of the species,) under the name of *K. Shavianum*, after the naturalist who had figured it: I soon afterwards, however, found that it was only a variety of the present species.

The *Kinosternon longicaudatum* of Spix, may be safely assumed as identical with this; the colour and markings of the head and limbs no less than the details of the shell, prove this to be the case. *K. brevicaudatum* of the same author, although at first sight apparently somewhat dissimilar, is probably only a sexual variety; as a specimen received some time since at the Zoological Society, has the plain scuta, short tail, and other characters of the latter, with the mottled head of the former, which it also resembles in size. Mr. Gray's "var. *acuta*" is most likely the character of immature age.

Spix, by some strange oversight, assigns to each of the individuals described by him, twenty-five marginal plates; though in the figures they have each twenty-three, the number which not only invariably belongs to this species, but also to all others of the genus.

The habits of this tortoise would appear to sanction the situation in which I had placed the genus in the paper on the Box Tortoises, before alluded to, as well as in a subsequent attempt to establish the characters of the different groups of the Testudinata; namely, amongst the Box Tortoises, and nearer to the terrestrial family than the rest of the *Emydidæ*. The remarkable elevation of the shell would at once point out in this case, as well as in *Terrapene clausa*, that they cannot be suited for the rapid pursuit of their prey in the water, and we find consequently that they principally live in marshes, along the borders of rivers.



J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.

CYCLEMYS ORBICULATA. *Bell.*

CYCLEMYS ORBICULATA, *Bell.*

CYCLEMYS ORBICULATA, *Bell.*

Testâ suborbiculari, carinatâ, posticè dentatâ, fuscâ; scutis sterni flavescentibus, fusco radiatìm lineatis.

Emys orbiculata. Bell.
Emys Dhor. Gray, Syn. Rept. p. 20.
Cistuda Diardii. Bibron, Hist. Rept. II. p. 227.

Habitat in Indiâ.
Mus. nostr.

Descriptio. *Caput* suprà planum, scuto unico, glabro tectum, fuscum, rostro nigricante. *Maxillæ* fortes, marginibus undulatis; superior anticè bidentata. *Collum* scabriusculum, rugosum, fuscum. *Pedes anteriores* nigricantes, suprà squamis transversis, imbricatis, palmæ, squamalis rotundis, tectæ: *ungues* curvi, breves, subacuti. *Pedes posteriores* rugosi, scabriusculi, digitis et plantis squamatis. *Cauda* mediocris, tenuis, acuta, scabra, nigricans. *Testa* suborbicularis, anticè levitèr emarginata, posticè utrinque quinque-dentata, suprà plana, carinata, ad latera declivis. *Scuta dorsalia* fusca, colore pallidiore obsoletè radiata et variegata, levitèr sulcata: *vertebralia* carinata, areolis ad marginem posteriorem positis; carinâ nigrâ, anticè et posticè elevatiusculâ, medio depressâ; primum arceolatum, altè carinatum anticè utrinque depressum; secundum, tertium et quartum hexagona; quintum irregularitèr sexlaterale, posticè expansum, lateribus postico-externis brevissimis: *costalia* declivia, suprà obsoletè carinata; primum figuræ irregularis, subtriangulare, margine externo rotundato, anticè excavatum; secundum et tertium quadrato-pentagona; quartum quadratum vel rhomboidale: *marginalia* præcipuè quadrata; anteriora ferè horizontalia; lateralia declivia; posteriora paulò recurva, octavum utrinque usque ad duodecimum angulo postico prominente, marginem testæ dentatum reddentia. *Scutum nuchale* lanceolatum, elevatum, anticè prominens, nigrum. *Sternum* latissimum, medio planum, anticè et posticè versus testam dorsalem paulò elevatum, anticè porrectum, truncatum vel subemarginatum, posticè emarginatum, testam dorsalem longitudine ferè æquans: *scuta* flavescentia, fusco radiatìm lineata, areolis posticis: *gularia*

porrecta, triangularia vel subrhomboidea: *humeralia* atque *femoralia* quadrangula, latere exteriore rotundato, interiore angustato: *pectoralia* et *abdominalia* magna, oblongo-quadrata: *analia* quadrangula, posticè angustata: *axillaria* et *inguinalia* minuta, et à squamis ligamentum tegentibus parùm diversa. Ligamentum quod sternum testæ dorsali annectit, à medio scuti pectoralis usque ad marginem posteriorem scuti abdominalis extendit, squamulis numerosis tenuibus tectum.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	8	0
Latitudo ejusdem	7	0
Longitudo sterni	7	8
Altitudo	3	0

In constituting the present genus upon a single character and from a single known species, I have been influenced by the importance of that character, as affording a new illustration of the relations of various forms of the family *Emydidæ*. That the annectant characters which indicate the passage from the *Testudinidæ*, or Land Tortoises, to the freshwater group, are to be found in the Box Tortoises forming the genus *Terrapene*, I have on more than one occasion endeavoured to demonstrate; and if there were a hiatus in this part of the series according to our former knowledge of them, it appears to me to be filled up by the present form, which not only bears a very obvious relation to *Terrapene* in the structure of the sternum, but also, by its manifest affinity to the Indian forms of the genus *Emys*, at once shows the situation in the group which is naturally occupied by these, and thereby assists us greatly in determining the general arrangement of the whole family. We have here an additional instance of the value which often attaches to the discovery of a single species, when such species, as in the present instance, proves to be intermediate between two forms, the mutual relations of which would, without it, have at least been doubtful, if not wholly unsuspected.

The striking similarity in the general form between this species and *Emys spinosa*, would almost lead us, on a superficial examination of the young of

the latter and the adult of the present, to suppose that they were specimens of an identical species, differing in age. The general orbicular form, the strong denticulations of the margin, the distinct carina, and the radiated lines on the sternum, as well as the general colour, may readily produce this impression; but closer observation will point out, not specific only, but generic distinctions between them. The permanent separation of the sternal from the dorsal bones, which are only connected by means of a ligament similar to that which performs the same office in *Terrapene*, is sufficiently important to warrant this conclusion; and on the other hand, the integrity of the whole sternum effectively distinguishes it from the true Box Tortoises, which have invariably one or more transverse divisions of the sternum itself, the lobes of which move as on a hinge; whilst in *Cyclemys*, the only motion of which the sternum is susceptible is that of being brought altogether a very little nearer to the dorsal shell. In *Terrapene europæa*, indeed, these two kinds of motion are combined, though each of them exists but in a small degree. Placing it, therefore, next to the Box Tortoises, we are compelled, by the affinities which I have mentioned, to view the Indian form of the genus *Emys* as that which most closely approximates to it on the other side, and consequently that which approaches most nearly to the Box Tortoises; a conclusion which could not have resulted from our previous knowledge of the group.

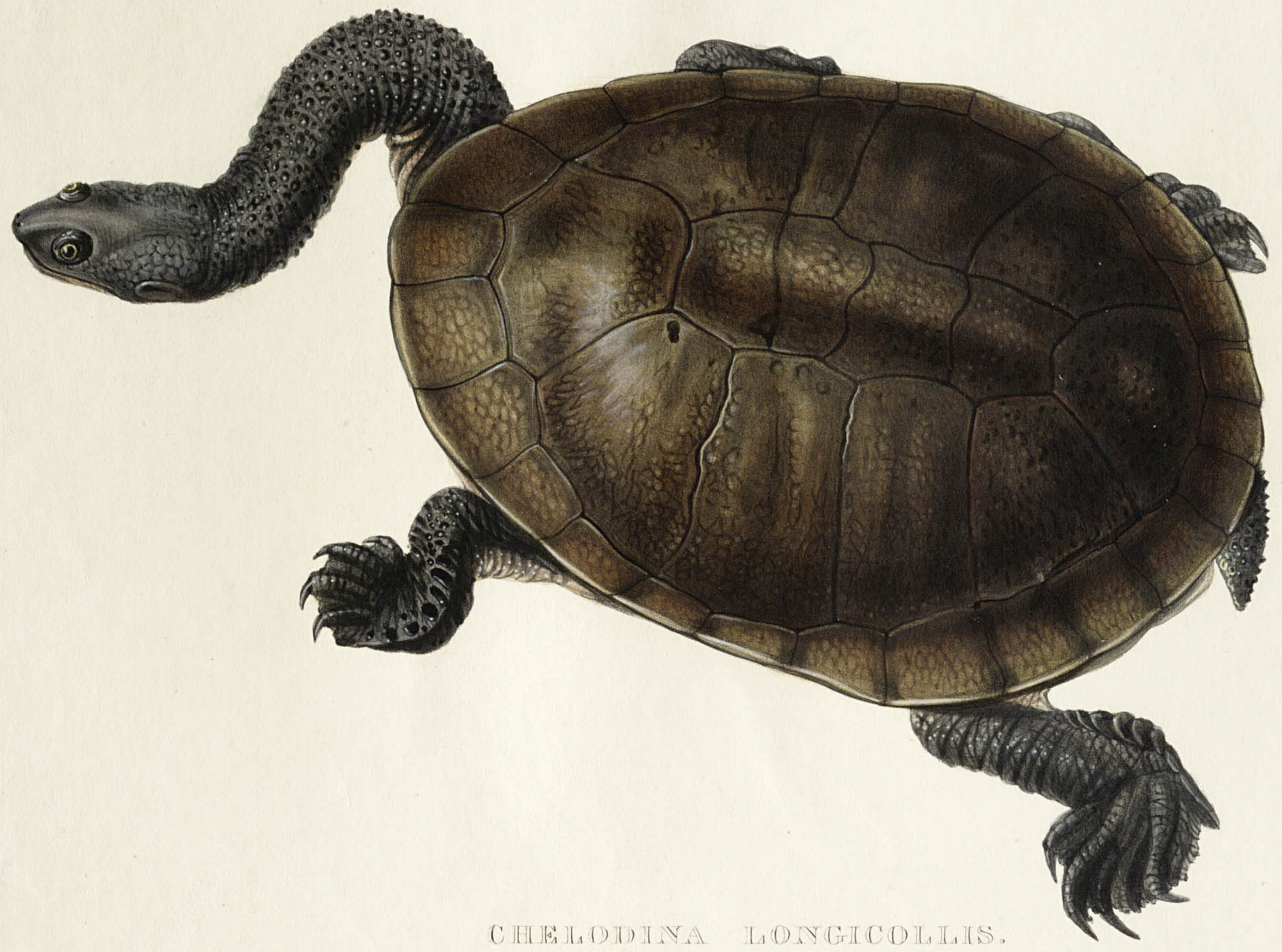
The specimens which I possess of this species have reached me from various oriental localities; from Madras, Bombay, and China. I have had not less than six or seven living, of various ages.

One of the individuals lived in my possession for many months, feeding heartily on raw flesh. Its flattened form and thin expanded margin enabled it to swim with great rapidity.

To the very young state Mr. Gray has in his Synopsis given the name of *Emys Dhor*, after Dr. Hamilton. The name *orbiculata* had, however, been previously assigned to it by myself; and I retain it not only on this account, but because of some doubt which exists as to the identity of Hamilton's species with the present.

Mons. Bibron has placed this species in the genus *Cistuda* (*Terrapene*, nob.), to which, however, I cannot assent. There is no division of the sternum into

two distinct moveable lobes, and the general form and aspect of the animal are essentially different from that genus. The true relations of the two forms I have endeavoured to explain above. The author just named has given this species the appellation of *Cistuda Diardii*, which must only be allowed to swell the list of synonyms, as the present name had been employed to designate it long before, and is actually quoted as a synonym by Mons. Bibron.



CHELODINA LONGICOLLIS.

J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

CHELODINA LONGICOLLIS.

CHELODINA LONGICOLLIS.

Testâ suprà fuscâ; sterno flavo, suturis nigris.

Testudo longicollis. Shaw, Gen. Zool. III. p. 62. t. 16. Zool. New. Holl. I. p. 19. t. 7.—Schœpff. Hist. Test. p. 135.
Emys longicollis. Schweig. Prod. p. 309. sp. 28.
Hydraspis longicollis. Bell, Zool. Journ. III. p. 512.
Chelodina longicollis. Gray, Syn. p. 39.
Chelodina Novæ Hollandiæ. Bibron, Erpet. II. 443.

Habitat in lacubus et paludosis Australiæ.
Mus. nostr., Mus. Brit.

Descriptio. *Caput* depressum, collo vix latius, suprà glabrum, lateribus squamosis, nigriscenti plumbeum; *nasum* subproductum naribus terminalibus; *oculi* parvi, prominentes, vivaces, iridibus pallidè flavis; *oris rictus* mediocris; *mentum* tuberculis quatuor minutis. *Collum* testam longitudine æquans, cylindricum, rugosum, tuberculatum, flexibile, suprà plumbeo-nigrum, subtùs pallescens, sub margine anteriore testæ, horizontalitèr duplicatum retractile. *Pedes* squamosi, suprà nigricantes, subtùs sordidè flavescentes, digitis singulorum quatuor tantùm unguiculatis, externis muticis. *Cauda* tuberculata, brevis, obtusè conica. *Testa* ovata, margine integro, anticè rotundata, posticè subangulata, subelevata, medio depressa vel subcanaliculata, omninò rugosa, et quasi tuberculata, fusca, suturis nigris. *Scuta* integerrima, sulcis angustis, profundis separata, areolis nullis: *vertebralia* depressa; primum planum, maximum, subpentagonum; secundum, tertium, quartum quadrato-hexagona; quintum pentagonum: *costalia* levitèr convexa, declivia; primum trapezium; secundum et tertium oblonga; quartum subquadratum: *marginalia* declivia, quadrata, integerrima; anteriora et posteriora latiora; intermedia angustissima: *scutum nuchale* quadratum, planum. *Sternum* latissimum, integrum, anticè rotundatum, posticè angulatè emarginatum, alis angustis: *scuta sterni* plana, glabra, flava, suturis nigris; *gularia* transversa, quadrilatera, angusta; *intergulare* magnum, hexagonum, angulo postico

acuto, producto, medio subelevatum; *humeralia* parva, quadrilatera, margine exteriore longissimo, interiore brevissimo; *pectoralia* maxima, irregularitèr quadrilatera, alis anticè profundè sinuatis; *abdominalia* transversè quadrilatera; *femoralia* trapezoidea; *analia* subrhomboidea.

Testæ osseæ mensura.

	unc.	lin.
Longitudo dorsi	6	5
Latitudo ejusdem	4	8
Longitudo sterni	5	6
Altitudo	2	2

Of this, the typical, and at present the only known species of the genus, little has hitherto been ascertained respecting its habits, and even its characters have been but imperfectly described. The first account of it is given by Dr. Shaw in the Zoology of New Holland, and in the General Zoology, accompanied by a plate; but he observes that nothing was known of its manners or history. Schweigger, who states that he saw a living specimen in Paris, is also silent on this point. The acquisition of a very fine healthy individual, for which I am indebted to the kindness of my friend Walter Buchanan, Esq., has, however, enabled me to add some details of its mode of feeding and other habits, as far as can be ascertained in a state of comparative confinement.

It has now been in my possession more than a year, and still continues in the best health. During the summer of 1834 it fed heartily, and almost voraciously on small living fish. It inhabited a small pond in company with four specimens of *Emys concentrica*. Wishing to ascertain the truth of the statement that the air-bag of fishes is rejected by piscivorous *Testudinata*, I placed six living dace in the tank with the five tortoises above mentioned: it was late in the evening. The next morning I found five air-bags floating on the surface, and one of the fish still swimming about. This took place generally, though not invariably, in several other instances; but I afterwards found that they ceased to reject the air-bags, at least as a general rule. It is exceedingly familiar, and will follow the finger from one part of the pond to another, in search

of food, which it readily takes from the hand. It occasionally comes on shore to sun itself, but speedily regains the water if disturbed, and always remains in it at night. One of its most remarkable habits is that it very frequently rises to the surface, and remains with only the anterior part of the head just behind the eyes emerged, the rest of the head with the whole body being under water, in which position it will continue motionless for a considerable time; a circumstance which shows a remarkable power of regulating its specific gravity by the quantity of air taken into the lungs, as it must necessarily preserve the specific gravity of the water, excepting the small portion of the head which is exserted. When in this position, the remarkable brilliancy of the eyes, the smallness of its head, and the excessive length of the neck, render it a very peculiar and striking object.

Like the whole family of *Hydraspidæ*, it retracts its head by bending the neck laterally, and from the great length of that part, it requires two complete duplications to conceal it wholly under the anterior edge of the upper shell, which, when thus retracted, it exactly meets, occupying the whole space between the fore legs. Its powers of swimming are considerable, as may be supposed from the narrowness of the alæ of the sternum, allowing great space for the motion of all the legs. The feet present the remarkable anomaly of having four nails only on each.

TORTOISES,

TERRAPINS, AND TURTLES

DRAWN FROM LIFE

BY

JAMES DE CARLE SOWERBY, F.L.S.,

AND

EDWARD LEAR.

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INTRODUCTION.

THIS series of Plates was made under the superintendence of Mr. Thomas Bell, to illustrate his 'Monograph of the Testudinata,' a work in which the author intended to represent and describe not only all the known recent, but also fossil species. The publication of this extensive work was unfortunately interrupted (by the failure of the publisher) when only two-thirds of the plates that had been prepared (which in themselves formed but a limited portion of the intended work) were published.

We are informed in the original Prospectus that "The whole of the drawings are from the inimitable pencil of Mr. James Sowerby; and the author feels that he is only doing justice to that distinguished artist in natural objects when he states that in correctness of delineation, minute and elaborate execution, and taste in the general arrangement of the figures, nothing within the range of zoographical illustration has ever surpassed them. The Plates will be lithographed by Mr. Lear, coloured (so as to form the most perfect *facsimiles* of the drawings) by Mr. Bayfield. The joint talent of these excellent artists, exhibited in the illustrations of the Psittacidæ of the former gentleman, renders it unnecessary to say that the ability of the painter will be ably seconded by that of the lithographer and colourist." Which I entirely indorse.

The unsold stock and unpublished plates were purchased at Mr. Highley's sale by Mr. Sotheran, and the work has been in abeyance for many years.

Mr. Bell has declined to furnish the text for the unpublished plates. In this

difficulty Mr. Sotheran applied to me; and feeling that it was much to be regretted that such beautiful and accurate plates should be lost to science, and considering that such minutely accurate and detailed figures would not require to be accompanied by a description, I agreed to add a few lines of text to each Plate, containing first the original name that Mr. Bell placed upon them, then the name used in the Museum Catalogue of Tortoises, so as to bring the nomenclature to the level of our present knowledge of these animals, at the same time referring to a work in which the synonymy of the species is to be found. I have also added a few lines on the habits and manners of the species from works of authors who have had the opportunity of observing them in their native country.

Many of the specimens figured and the rest of Mr. Bell's Collection of Reptiles are now to be found in the Anatomical and Zoological Museum at Cambridge.

JOHN EDWARD GRAY.

British Museum,
November 20th, 1871.

TORTOISES, TERRAPINS, AND TURTLES.

1. TESTUDO TABULATA, *Walbaum.*

TAB. I. & II.

Testudo tabulata, Gray, Cat. Sh. Rept. Suppl. p. 4.

HAB. Central America and larger West-India Islands.

2. TESTUDO CARBONARIA, *Spix.*

TAB. III. & IV., and TAB. V. (var.).

Testudo tabulata, var., Gray, Cat. Sh. Rept. Suppl. p. 4.

HAB. Tropical America and larger West-India Islands.

This is a very variable species. The males are generally contracted on the sides and very concave beneath, which has caused them to be regarded as a distinct species. This Tortoise sometimes has an exceedingly thick and heavy case, raised beneath each of the plates so as to give a considerable degree of elevation to each dorsal plate. (See Tab. III.)

3. TESTUDO INDICA, *Bell.*

TAB. VI. (young).

Testudo elephantopus, Gray, Cat. Sh. Rept. Suppl. p. 5.

HAB. Galapagos Islands; Ecuador; west coast of Tropical America.

According to Mr. Blyth, this Tortoise has been introduced, and breeds and multiplies in Jamaica and other West-India Islands.

This species has been confounded with *Testudo indica*, which differs from it in having a distinct nuchal plate and a differently shaped head, and which is a native of the Seychelles, whence it is often introduced into the gardens of the Mauritius, where it is eaten. Some have been brought thence to India; but Mr. Blyth states that it has never been known to propagate in that country.

General Hardwicke figures a very young specimen which he had at Bengal; but it might have been introduced.

Mr. Darwin observes:—"These animals are found, I believe, on all the islands of the Archipelago, certainly on the greater number. They frequent in preference the high damp parts, but they likewise live in the lower and arid districts. I have already shown, from the numbers which have been caught in a single day, how very numerous they must be. Some grow to an immense size; Mr. Lawson, an Englishman, and Vice-Governor of the colony, told us that he had seen several so large that it required six or eight men to lift them from the ground, and that some had afforded as much as two hundred pounds of meat. The old males are the largest, the females rarely growing to so large a size: the male can readily be distinguished from the female by the greater length of its tail. The Tortoises which live on those islands where there is no water, or in the lower and arid part of the others, feed chiefly on succulent cactus. Those which frequent the higher and damp regions, eat the leaves of various trees, a kind of berry (called *guayavita*) which is acid and austere, and likewise a pale green filamentous lichen (*Usnea plicata*) that hangs in tresses from the boughs of the trees.

"The Tortoise is very fond of water, drinking large quantities, and wallowing in the mud. The larger islands alone possess springs; and these are always situated towards the central parts, and at a considerable height. The Tortoises, therefore, which frequent the lower districts, when thirsty, are obliged to travel from a long distance. Hence broad and well-beaten paths branch off in every direction from the wells down to the sea-coast; and the Spaniards, by following them up, first discovered the watering-places. When I landed at Chatham Island, I could not imagine what animal travelled so methodically along well-chosen tracks. Near the springs it was a curious spectacle to behold many of the huge creatures, one set eagerly travelling onwards with outstretched necks, and another set returning, after having drunk their fill. When the Tortoise arrives at the spring, quite regardless of any spectator, he buries his head in the water above his eyes, and greedily swallows great mouthfuls, at the rate of about ten in a minute."

Captain David Porter, in his Journal of a Cruise made to the Pacific Ocean in the U.S. Frigate 'Essex' in the years 1812–14, states:—"Four boats were despatched every morning to bring in a stock of Tortoises, and returned at night, bringing with them from twenty to thirty each, averaging about 60 lbs.; and in four days we had as many as we could conveniently stow. They were piled up on the quarter-deck for a few days, in order that they might have time to discharge the contents of their intestines, which are considerable; after which they were stowed away below, like any other provision. They require no food or water for a year; nor is any further attention to them necessary, than that their shells should be preserved unbroken."

4. TESTUDO RADIATA, *Shaw.*

TAB. VII. & VIII.

Testudo radiata, Gray, Cat. Sh. Rept. Suppl. p. 5.

HAB. Madagascar.

Characterized by the spherical form of the shell, the yellow areola, and black rays of the shields.

5. TESTUDO PARDALIS, *Bell.*

TAB. IX. & X.

Testudo pardalis, Gray, Cat. Sh. Rept. Suppl. p. 6.

HAB. South (and Western?) Africa.

Mr. Bell observes:—"The neck was so remarkably long and extensile, that the head could be easily raised much above the level of the top of the back; and thus the animal was enabled to look round on all sides, merely by turning the head—a peculiarity which I have never observed in any other species." "It fed heartily on grass, which it appeared to prefer to any other food, and which it plucked with a sidelong movement of the head, exactly similar to that of a goose."

6. TESTUDO ACTINODES, *Bell.*

TAB. XI. & XII.

Peltastes stellatus, var. *actinoides*, Gray, Cat. Sh. Rept. Suppl. p. 8.

HAB. East Indies.

It varies greatly in the number of yellow rays, and in the flatness and convexity of the dorsal shields.

The specimen figured is peculiar for having very convex shields, which Mr. Bell considered a specific character.

This is a tender species, and will not live in this country during the winter.

These animals, according to Captain T. Hutton, have the curious habit of butting one another when two animals happen to meet, which causes the nuchal margin of adult shells to be often chipped.

7. TESTUDO GEOMETRICA, *Linn.*

TAB. XIII.

Peltastes geometricus, Gray, Cat. Sh. Rept. Suppl. p. 9.

HAB. South Africa.

This species will not live through the winter in this climate, according to Mr. Bell's experience.

8. TESTUDO TENTORIA, *Bell.*

TAB. XIV.

Peltastes tentorius, Gray, Cat. Sh. Rept. Suppl. p. 9.

HAB. South Africa.

This species is very like *P. geometrica*; but the dorsal shields are generally conical, with a small

areola; and it has a very small nuchal plate. The sternum is not rayed, but black in the centre and white at the sides.

Similar specimens, similarly conical and prominent, also occur in *Peltastes geometricus*, which always have a larger nuchal shield and rayed underside.

9. TESTUDO MARGINATA, *Schœpf.*

TAB. XV.

Peltastes marginata, Gray, Cat. Sh. Rept. Suppl. p. 10.

HAB. Shores of the Mediterranean; Greece.

This species is peculiar for the extraordinary expansion of the postorior margin, which renders it one fifth broader over the thighs than at the middle of the shell, especially in the male specimens.

Mr. White, of Selbourne, for many years kept a female of this species, and gives a history of it in his interesting work. The Tortoise was named *Testudo Whitei* by Mr. Edward Bennett, and was presented to the British Museum in 1858 by Mrs. Christopher, the niece of Mr. White.

10. TESTUDO GRÆCA, *Linn.*

TAB. XVI.

Peltastes græcus, Gray, Cat. Sh. Rept. Suppl. p. 12.

HAB. Shores of the Mediterranean; Asia Minor.

This species is brought every year to London by the fruit-ships, and sold about the streets.

I am informed that it is often used to make soup.

11. TESTUDO SULCATA, *Miller.*

TAB. XVII. & XVIII.

Peltastes? sulcatus, Gray, Cat. Sh. Rept. Suppl. p. 12.

HAB. East Africa; Abyssinia.

This species is peculiar for the great height of the marginal plates, and for the very large scales on the fore legs, and for the small size and produced form of the gular and anal shields.

A species very similar to this in general form and appearance is found on the eastern slopes of the Andes; it has been confounded with it by several authors, but is at once distinguished from it by its more depressed form and the shortness of the marginal plates. It is figured as *Testudo chilensis* in the 'Proceedings of the Zoological Society,' 1870.

12. TESTUDO ANGULATA, *Duméril.*

TAB. XIX.

Chersina angulata, Gray, Cat. Sh. Rept. Suppl. p. 13.

HAB. South Africa.

This species is at once known by its having only a single, narrow, produced gular plate in front of the sternum, which forms a ledge for the defence of the throat.

13. TESTUDO SIGNATA, *Walbaum.*

TAB. XX.

Homopus signatus, Gray, Cat. Sh. Rept. Suppl. p. 13.

HAB. South Africa.

This species has only four claws on its front feet. The vertebral and costal plates are all about as broad as long, and the hinder marginal plates are angular and revolute.

14. TESTUDO AREOLATA, *Thunberg.*

TAB. XXI.

Homopus areolatus, Gray, Cat. Sh. Rept. Suppl. p. 13.

HAB. South Africa; Madagascar.

The front legs are covered with very large scales, and have only four claws on the fore feet; the first vertebral and costal plates are much longer than broad, and the others much broader than long, the lateral margin revolute.

Mr. Bell says:—"This species is easily familiarized. I have repeatedly had them so tame as to take food readily from the hand, and even to eat from one hand when held in the other."

15. TERRAPENE CLAUSA, *Merrem.*

TAB. XXII.

Cistudo carolina, Gray, Cat. Sh. Rept. Suppl. p. 19.

HAB. North America, from Hudson's Bay to the Gulf of Florida.

This is one of the most variable species in its coloration. Bell divided it into three species; and Agassiz has more recently done the same. There is an allied species which has only three claws on

the hind foot, peculiar to Mexico; some writers consider it to be only a local variety. The genus is peculiar for having no zygomatic arch to the skull.

Dr. Holbrook observes that "this Tortoise is found from one extremity of the United States to the other, even as far north as Maine, south as far as Louisiana, Florida, and Alabama, and west as far as the Missouri river." He says, "It is entirely a land animal; indeed it is so bad a swimmer that it will drown at the end of a few days if thrown into water. In the Southern States it is always found in dry places, and is very numerous in the immense pine-forests of that country, and is hence frequently called pine-barren Terrapin, or *cooter*, by the negroes (a word probably of African origin, and applied to some similar animal). It feeds on insects, crickets, &c., and, according to Leconte, on fungous plants, as the *Clavaria* &c. When in confinement (and it can easily be domesticated), it eats readily whatever is offered, as bread, potatoes, apples, &c."

16. TERRAPENE AMBOINENSIS, *Merrem.*

TAB. XXIII.

Cuora amboinensis, Gray, Cat. Sh. Rept. Suppl. p. 21.

HAB. Amboina, Gilolo, Borneo, Batchian, Booro, and Santang.

The heads vary much in shape in the different specimens from the same locality: in some males they are very broad; in others, male and female specimens, the heads are much narrower.

17. CYCLEMYS ORBICULATA, *Bell.*

TAB. XXIV. & XXV.

Cyclemys dhor, Gray, Cat. Sh. Rept. Suppl. p. 23.

HAB. Java.

The lower figure on Tab. XXV. agrees with the specimens in the British Museum; it represents the lobes of the sternum, especially the hinder one, narrower than the thorax, leaving a space for the legs to come out, as is the case with all the Museum specimens. The upper figure of the underside, which probably belongs to the perfect animal figured on the other Plate, is peculiar for the great width and broad rounded form of the front and hinder lobes of the sternum, so as to leave scarcely any opening in the thorax. I have never seen a specimen which agrees with these figures; and it will probably be one from some other part of India, which has not yet made its appearance in the Museum.

"They are found in the hill-streams in Pegu, Birmah; some men, especially the Karens, being very expert in detecting their haunts, which are much the same as those of the soft Turtles (Trionycidæ)."

"This species is pretty common in the hill-streams of Pegu and Tenasserim. It is active in its movements; and the flesh is excellent. The stomachs of many which I have opened have contained vegetable matters and the fruit of *Ficus glomerata* or other figs. The eggs are elongate-oval or, rather, cylindrical, very large for the animal, and four in number."—THEOBALD.

18. EMYS SPINOSA, *Bell.*

TAB. XXVI. & XXVII. (old and young).

Geoemyda spinosa, Gray, Cat. Sh. Rept. Suppl. p. 25.

HAB. Penang, Sumatra, Borneo, Camboja, and Pegu.

The males of these animals have a concave sternum like the Land Tortoises. The eggs are large, elongate; they are deposited a few at a time in holes of about 9 inches deep in the most unfrequented parts of the forest.

19. EMYS GUTTATA, *Schweigger.*

TAB. XXVIII. (upper and under sides).

Geoclemmys guttata, Gray, Cat. Sh. Rept. Suppl. p. 27.

HAB. North America.

According to Holbrook this species, like *Emys picta*, is widely extended. Leconte, who is a good authority, says "over the whole United States."

I have observed it from the Atlantic border, from lat. 43° to Florida, but have never seen a specimen from the Western or South-western States.

It is timid and gentle and can easily be domesticated. It lives in ponds, brooks, and rivers, feeding on such animals as it can seize, as tadpoles, young frogs, &c. It takes to the land frequently in search of food, devouring earthworms, crickets, grasshoppers, &c.

20. EMYS SCABRA, "*Linn.*"

TAB. XXIX. & XXX.

Rhinoclemmys scabra, Gray, Cat. Sh. Rept. Suppl. p. 30.

HAB. South America.

The eggs are of a peculiar form, being long oval. The head is black, with a red spot on each side of the nose and on the occiput, and a sinuous and urn-shaped band over the orbits and temples. In the streak on the head the figure is different from any specimen that I have seen; and I therefore propose to call it, provisionally, *Rhinoclemmys Bellii*.

21. EMYS LUTARIA, *Lacépède.*

TAB. XXXI. & XXXII. (old and young.)

Emys caspica, Gray, Cat. Sh. Rept. Suppl. p. 36.

HAB. South Europe.

22. EMYS CONCENTRICA.

TAB. XXXIII.–XXXVI.

Malaclemmys concentrica, Gray, Cat. Sh. Rept. Suppl. p. 42.

HAB. North America.

The alveolar surface of this Tortoise is very broad, nearly flat, only slightly concave in front, occupying the whole length of the upper jaw, very unlike the jaws of the other North-American Terrapins, which, perhaps, explains the superiority of its flesh.

Professor Agassiz truly observes, "This species varies remarkably in its colour and sculpture, as well as in the size of the head,"—all characters used to separate other species of Terrapins.

According to Dr. Holbrook this species "lives in salt water and in salt marshes, where it hibernates; far from these it is never seen. It is a timid animal, easily disturbed, and hiding itself on the least alarm. It swims with great rapidity, and, unlike its tribe in general, moves quickly even on land."

It is found "from Rhode Island to Florida. They exist also along the northern shores of the Gulf of Mexico. This seems to be the only *Emys* common to North and South America, and it does not appear to be found in the West-India Islands.

"They are very abundant in the salt marshes around Charleston, and are easily taken when the female is about to deposit her eggs, in the spring and early summer months. They are then brought in immense numbers to market; yet, notwithstanding this great destruction, they are so prolific that their number appears undiminished. Their flesh is excellent at all times; but in the northern cities it is most esteemed when the animal has been dug out of the mud in its state of hibernation. The males are smaller than the females, and have the concentric striæ more deeply impressed."

23. EMYS GEOGRAPHICA, *Lesueur.*

TAB. XXXVII. & XXXVIII.

Graptemys pseudogeographica, Gray, Cat. Sh. Rept. Suppl. p. 45.

HAB. North America.

According to Dr. Holbrook, this animal inhabits many of the rivers that empty themselves into the Pacific, and is abundant in some, but has never yet been found to the eastward of the Alleghany range of mountains; it is entirely aquatic; and although frequently seen on fallen trees or rocks that rise above the water, yet it only seeks the land in the breeding-season. It feeds on various small fish, reptiles, &c.

24. EMYS DECUSSATA, *Bell.*

TAB. XXXIX. & XL.

Pseudemys decussata, Gray, Cat. Sh. Rept. Suppl. p. 47.

HAB. North America.

Mr. Bell says that "This is the species most commonly brought alive to this country. They are voracious, like their congeners, tearing in pieces and greedily devouring meat, frogs, small fish, or any other food of this kind. On being teazed, they snap at any object held near them with considerable quickness and force."

25. EMYS SERRATA, *Daudin.*

TAB. XLI.

Trachemys scripta, Gray, Cat. Sh. Rept. Suppl. p. 48.

HAB. North America.

According to Dr. Holbrook this Terrapin lives in ponds and pools of stagnant water, in the neighbourhood of which they hibernate. During the spring and summer seasons they are seen by hundreds basking in the sun, apparently asleep. They rest on the margins of the pond, or on some little islet, or on the trunks of fallen trees, from which, when disturbed, they plunge suddenly into the water and disappear. They live chiefly on such small repliles as they can seize and devour; when in confinement, however, they will eat vegetable substances, of which the purslain (*Portulaca oleracea*) appears to be their favourite food.

"The range of this animal is very limited, reaching only from Virginia to Georgia. In the neighbourhood of Charleston they are very abundant, and are brought to market in great numbers; their flesh is considered good, but it is by no means as delicate as the *Emys terrapin* or the *Emys reticulata*."

26. EMYS RUGOSA, *Bell.*

TAB. XLII. & XLIII.

Trachemys rugosa, Gray, Cat. Sh. Rept. Suppl. p. 48.

HAB. Tropical America; Cuba.

27. EMYS ORNATA, *Bell.*

TAB. XLIV. (very young.)

Callichelys ornata, Gray, Cat. Sh. Rept. Suppl. p. 48.

HAB. Central America; Guatemala.

28. EMYS TECTUM, *Bell.*

Tab. XLV.

Pangshura tecta, Gray, Cat. Sh. Rept. Suppl. p. 60.

Hab. India.

29. KINOSTERNON SCORPIOIDES, *Gray.*

Tab. XLVI.

Swanka scorpioides, Gray, Cat. Sh. Rept. Suppl. p. 67.

Hab. Mexico and Surinam.

This is a very variable species; for after the study of numerous specimens, many of them in very different states of preservation, I find them so variable that I believe the differences chiefly depend on the kind and clearness of the water which they inhabit; but I have not been able to discover any permanent character to separate them into species, some coming from Surinam or Guiana on the east side, and others from Mexico on the west side of the American continent.

30. CHELODINA LONGICOLLIS, *Gray.*

Tab. XLVII. & XLVIII.

Chelodina longicollis, Gray, Cat. Sh. Rept. Suppl. p. 72.

Hab. Australia.

The sternum of this species is peculiarly broad and oval in front, and the shields of it are surrounded by a dark edge. The shields of the dorsal disk are very thin and veined. It is peculiar for the extreme length of the neck, and, like all the other species of the genus, hides its head under the side of the shell when oppressed, and does not withdraw it into the shell as most other Tortoises.

31. HYDRASPIS GALEATA, *Schœpff.*

Tab. XLIX. & L.

Pelomedusa subrufa, Gray, Cat. Sh. Rept. Suppl. p. 81.

Hab. South Africa; Cape of Good Hope.

The Cape *Pelomedusa subrufa* is always known by the uniform colour of its shell, while the *Pelomedusa nigra*, from Natal, is blacker and has the lower margin varied with triangular red spots.

32. TRIONYX GANGETICUS, *Cuvier.*

Tab. LI. (young).

Trionyx gangeticus, Gray, Cat. Sh. Rept. Suppl. p. 97.

Hab. India; Ganges; Pegu.

"In hunting for the soft Turtles in the hill-streams the men use a long iron fork, such as an old iron ramrod sharpened at one end, or a stout strip of bamboo, which they thrust down for a foot or two in the soft vegetable sludge and decayed leaves found along the margin of deep pools in the hill-streams. If the fork touches a Turtle concealed below, the motion of the animal is felt: a cautious examination is then made with the hand, and a fish-hook is cleverly inserted in the soft part of the mantle about the tail, then another, and even three or four, if the animal is large. A steady haul is now made, and out comes the Turtle, wildly floundering and snapping at every thing within its reach with pertinacious ferocity.

"Sometimes, when the animal is large, or the water deep, a stake is held over the animal's back, and, with a few well-delivered blows of a mallet, driven through both shells. Woe betide the limb, however, which comes within reach of the infuriated animal! I saw the top of one man's toe bitten clean off by a *Trionyx Phayrei* which was being 'staked;' and as these animals are both active and ferocious, it is always advisable to send a bullet through their brain as soon as possible. So tenacious of life, however, are these creatures, that their heads bite vigorously after being completely dissevered from their bodies.

"The natives eat all sorts indiscriminately; and perhaps the flesh of even the highly carnivorous soft Turtles may be palatable."—Theobald, *Journal of the Linnean Society*, vol. x. p. 8.

33. TRIONYX LABIATUS, *Bell.*

Tab. LII.–LIV.

Tyrse nilotica, Gray, Cat. Sh. Rept. Suppl. p. 108.

Hab. Africa: (North) Nile; (West) Sierra Leone and Fernandovas River.

The skeleton (Tab. LIV.) figured by Mr. Bell is in the Museum of the Cambridge Philosophical Society; and I can see no difference between it and the skeletons from the Nile. Little was known of the development of the dorsal shield of these animals when Mr. Bell wrote; and he seemed to regard the length of the free part of the rib, which is dependent upon the youth of the specimen, as a specific character.

34. EMYDA PUNCTATA, *Gray.*

Tab. LV. & LVI.

Emyda ceylonensis, Gray, Cat. Sh. Rept. Suppl. p. 117.

Hab. India; Ceylon; Goa. Common in tanks, and breeding in them, and in ditches.

The figure is taken from a specimen in spirits; and I do not believe that it, or any species of the genus, has ever been imported alive into this country; but it is figured from life in Gray and Hardwicke's 'Illustrations of Indian Zoology.'

35. CHELONIA IMBRICATA.

Tab. LVII. & LVIII. (young).

Caretta imbricata, Gray, Cat. Sh. Rept. Suppl. p. 119.

Hab. The Ocean.

According to Dr. Holbrook this animal is only esteemed for the substance it affords, called "Tortoise-shell," which is but the laminæ or plates that cover the bony shell. Other species of *Chelonia* have a similar covering; but in no other are these plates sufficiently thick to be of any value in the arts.

"These laminæ are obtained by exposing the convex portion of the shell to a certain degree of heat, which destroys the connexion between the plate and the shell; it is now recurved from the borders to the centre, and can then be easily removed. These plates vary in thickness and in transparency, and are consequently arranged in classes of different value. Tortoise-shell is not considered of the best value unless the Tortoise has reached a certain size, about one hundred and sixty pounds; before that state it is too thin. The quality obtained varies much in weight in different animals; fifteen pounds is the most obtained even from animals of the largest size; yet this substance is so valuable that a *Chelonia imbricata*, of the same dimensions as the Green Turtle, would sell for ten times as much." "I am not aware that the habits of this animal differ from those of the *Chelonia caretta*; they seek similar localities and the same food, but in confinement they seem much more ferocious. I have seen them bite severely the *Chelonia mydas*, when swimming together in the same reservoir, though the other gave no offence; nor did he offer retaliation for the injury received."

Mr. Darwin gives, in his 'Journal of Researches' (p. 459), a curious account of how they catch and treat these Tortoises in the Chagos archipelago.

36. CHELONIA MYDAS.

Tab. LIX. & LX. (young).

Mydas viridis, Gray, Cat. Sh. Rept. Suppl. p. 119.

Hab. Atlantic Ocean.

Dr. Holbrook gives the following interesting account of the habits of this animal:—"They live mostly in deep water, feeding on marine plants, especially one called Turtle-grass (*Zostera marina*); this, according to Audubon, they cut near the roots, to procure the most tender and succulent part, which alone is eaten, while the rest of the plant floats to the surface, and is there collected in large fields—a sure indication that the feeding-ground of the Green Turtle is near. In confinement, however, they eat readily enough purslain (*Portulaca oleracea*), and even grow fat on this nourishment.

"Green Turtles are very seldom seen to approach the land, unless at certain seasons to lay their eggs; and in the months of April and May great numbers seek for this purpose the sandy shores of desolate islands or the uninhabited banks of certain rivers, where they are least liable to interruption in their work of reproduction. The Tortugas Islands are a favourite haunt; these are four or five uninhabited sand-banks, which are only visited by turtlers and wreckers. Between these islands are deep channels, so that the Turtles come at once to good landing. They are not confined, however, to these islands, but are found abundantly on other keys and inlets on the main. The female arrives by night: slowly and cautiously she approaches the shore, and, if undisturbed, crawls at once over the sand above high-water mark; here, with her fins, she digs a hole one or two feet deep, in which she lays her eggs, between one and two hundred in number. These she 'arranges in the most careful manner, and then scoops the loose sand back over the eggs, and so levels and smooths the surface that few persons, on seeing the spot, could imagine any thing had been done to it' (*Audubon*). This accomplished, she retreats speedily to the water, leaving the eggs to be hatched by the heat of the sun, which is generally accomplished in about three weeks. Two or three times in the season does the female return to nearly the same spot and deposit nearly the same number of eggs, so that the whole amount annually would be four or five hundred; and it is not a little singular that animals so low in the scale of creation should have the instinct to return to these haunts from great distances—hundreds, and even thousands of miles, in some instances in three weeks. Dr. Strobel informed me that several Turtles were captured at Tortugas, marked, and carried to Key West, there confined in a turtle-pen or 'crawl,' which was destroyed by a storm; the animals escaped, and in a few days were recaptured at Tortugas. During the actual time of incubation, Turtles may be approached without caution; for they are then so intent on this work of reproduction that nothing will disturb them.

"It is during the breeding-season that these animals suffer most from their enemies; they are then taken in a variety of ways, and are brought to our markets in immense numbers, being held in high estimation as a wholesome and delicious food. Many are caught at night on shore; these are turned on their backs; nor can they resume their natural position, in consequence of the shortness of their necks and the peculiar arrangement of their fins; and thus they remain until they can be leisurely collected the next day. Some are harpooned in the water; and great nets are spread for others at the entrance of creeks and rivers. Many are also taken by an instrument called a *peg*, which has been in common use since the time of Catesby.

"Audubon observes that he saw a man who, with his *peg*, had been known to secure eight hundred Green Turtles in one year—an immense number, certainly. When taken they are kept in pens, called 'crawls,' that are so placed in the water as to be filled at every flood-tide; and here they remain until sold.

"A still more wholesale mode of destruction is practised by robbing the nests of their eggs. The 'egger' uses a small stiff rod, with which he 'probes' the sand in those places where Turtles usually deposit their eggs; and in this way myriads are collected, as may be supposed when it is recollected that many hundreds of Turtles lay their eggs on a small space of sand-bank. The 'eggers,' however, do not confine their depredations to nests of the Green Turtles, but they seize upon those of all other species, as well as upon the eggs of thousands of sea-birds that seek the same localities during their breeding-season. But man is not their only enemy; many eggs are destroyed by Raccoons, and many young ones fall a prey to various rapacious aquatic birds before they reach the water; and many more, even after they have reached it, are devoured by ravenous fishes.

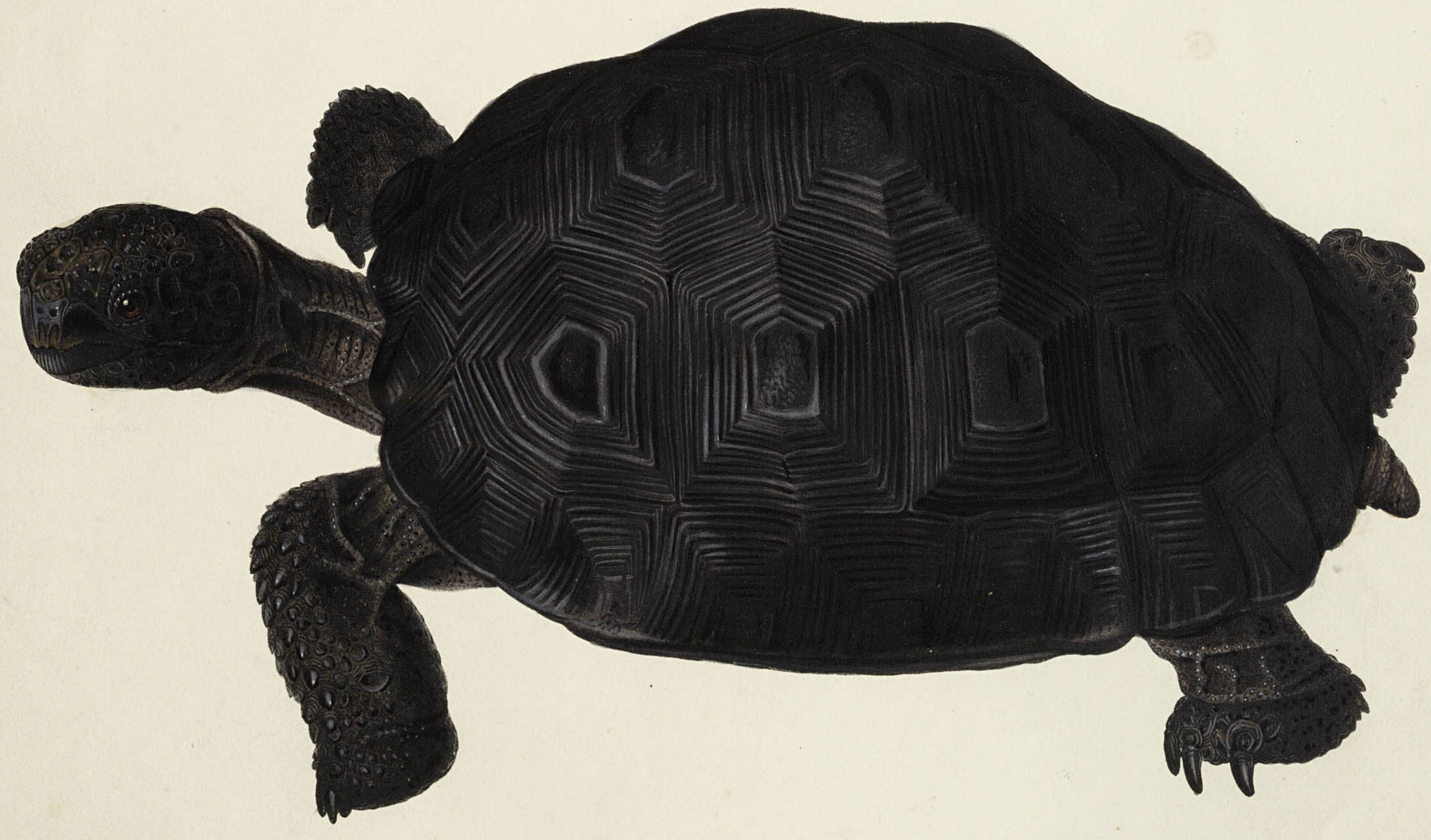
"They vary much in shape at different epochs of their lives; the carapace is broader in the young, and the vertebral plates are then more extensively transverse. They vary also exceedingly in colour, so that, of hundreds that I have frequently seen together, scarcely two could be selected of precisely similar colours."

The alveolar surface of the Turtles varies with the food they eat; thus the truly vegetable-eating Green Turtle, which has such delicate flesh, has two harsh ridges on the alveolar surface of the upper jaw, interrupted by a deep pit in front. The Hawk's-bill and the Logger-head, which are carnivorous, have coarse and offensive flesh, and a much more simple alveolar surface; the Hawk's-bill has a single linear ridge which is not found in the Logger-head, but has the alveolar surface, both of the upper and lower jaw, simply concave. Similar differences are to be found among the Terrapins or Freshwater Tortoises. Thus the alveolar surface of the herbivorous Batagur of India has very well-marked ridges, and the more carnivorous Terrapins have this part of the jaws more or less broad and smooth, which form very good characters for separating them into families and genera.

LIST OF PLATES.

Plate.	Name on Plate.	Modern Name.
I. & II.	Testudo tabulata	Testudo tabulata.
III. & IV.	—— carbonaria	—— ——, male.
V.	—— ——, *B*	—— ——, var.
VI.	—— indica (young)	—— elephantopus (young).
VII. & VIII.	—— radiata	—— radiata.
IX. & X.	—— pardalis	—— pardalis.
XI. & XII.	—— actinodes	Peltastes stellatus, var.
XIII.	—— geometrica	—— geometricus.
XIV.	—— tentoria	—— tentorius.
XV.	—— marginata	—— marginatus.
XVI.	—— græca, *a*	—— græcus.
XVII. & XVIII.	—— sulcata (uncoloured)	—— ? sulcatus.
XIX.	—— angulata	Chersina angulata.
XX.	—— signata	Homopus signatus.
XXI.	—— areolata	—— areolatus.
XXII.	Terrapene clausa	Cistudo carolina.
XXIII.	—— amboinensis	Cuora amboinensis.
XXIV. & XXV.	Cyclemys orbiculata	Cyclemys dhor.
XXVI. & XXVII.	Emys spinosa (old and young)	Geoemyda spinosa.
XXVIII.	—— guttata (uncoloured)	Geoclemmys guttata.
XXIX. & XXX.	—— scabra	Rhinoclemmys scabra, *var*. Bellii.
XXXI. & XXXII.	—— lutaria	Emys caspica.
XXXIII.-XXXV.	—— concentrica	Malaclemmys concentrica.
XXXVI.	—— concentrica, *b*	—— concentrica, var. ?
XXXVII. & XXXVIII.	—— geographica	Graptemys pseudogeographica.
XXXIX. & XL.	—— decussata	Pseudemys decussata.

Plate.	Name on Plate.	Modern Name.
XLI.	Emys serrata	Trachemys scripta.
XLII. & XLIII.	—— rugosa	—— rugosa.
XLIV.	—— ornata (young)	Callichelys ornata.
XLV.	—— tectum	Pangshura tecta.
XLVI.	Kinosternon scorpioides	Swanka scorpioides.
XLVII. & XLVIII.	Chelodina longicollis	Chelodina longicollis.
XLIX. & L.	Hydraspis galeata	Pelomedusa subrufa.
LI.	Trionyx gangeticus (young)	Trionyx gangeticus.
LII.–LIV.	—— labiatus	Tyrse nilotica.
LV. & LVI.	Emyda punctata	Emyda ceylonensis.
LVII. & LVIII.	Chelonia imbricata (young)	Caretta imbricata.
LIX. & LX.	—— mydas (young)	Mydas viridis.



TESTUDO INDICA. *Young.*

2/3 long. nat:

J. D. C. Sowerby del: E. Lear, lithog. *Printed by C. Hullmandel*

TESTUDO MARGINATA.

J. D. C. Sowerby del. E. Lear, lith.

Printed by C. Hullmandel.

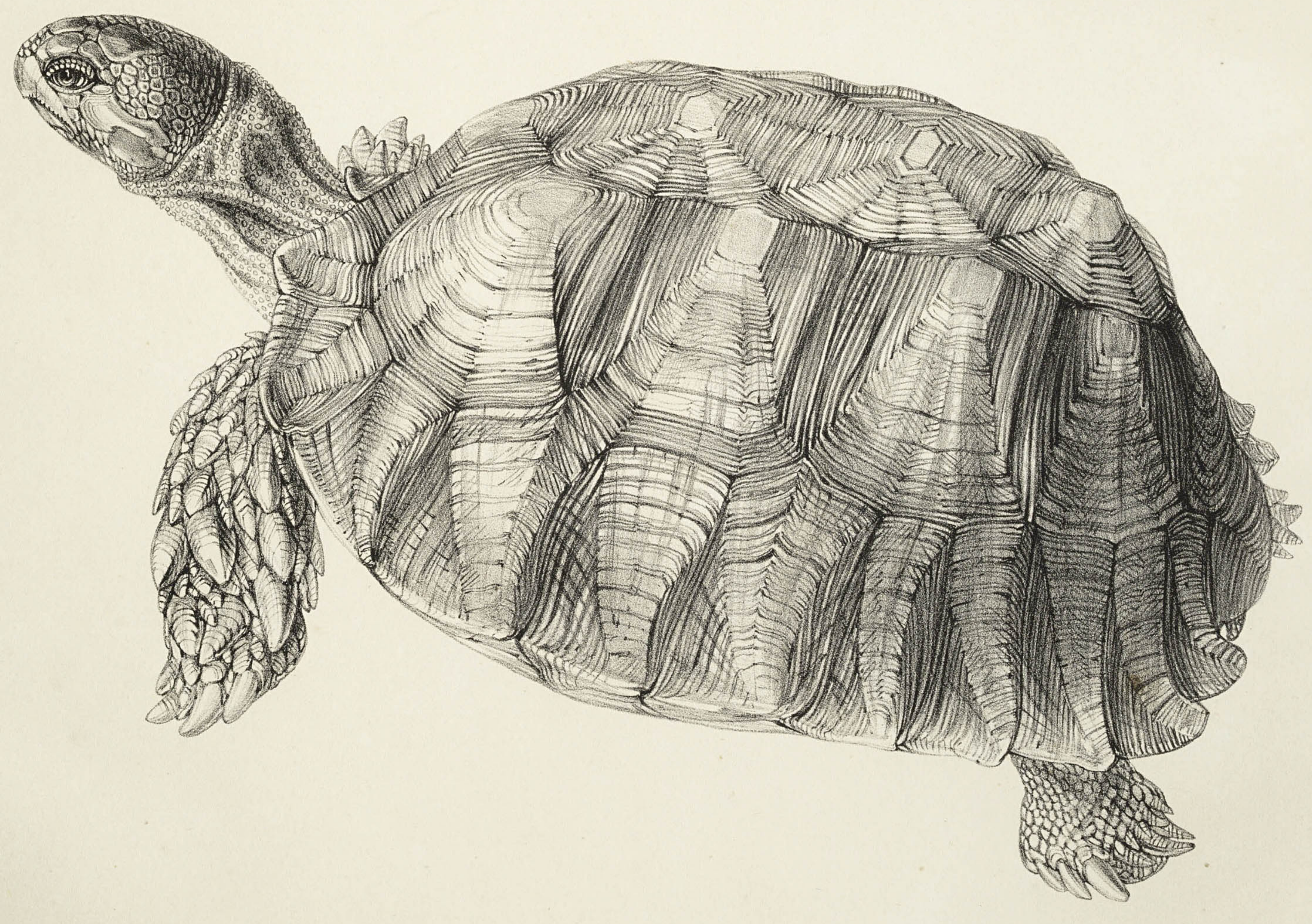
TESTUDO GRÆCA, *a*.

J. De C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel

TESTUDO SULCATA. 1/3

Printed by C. Hullmandel.



TESTUDO SULCATA.

1/3

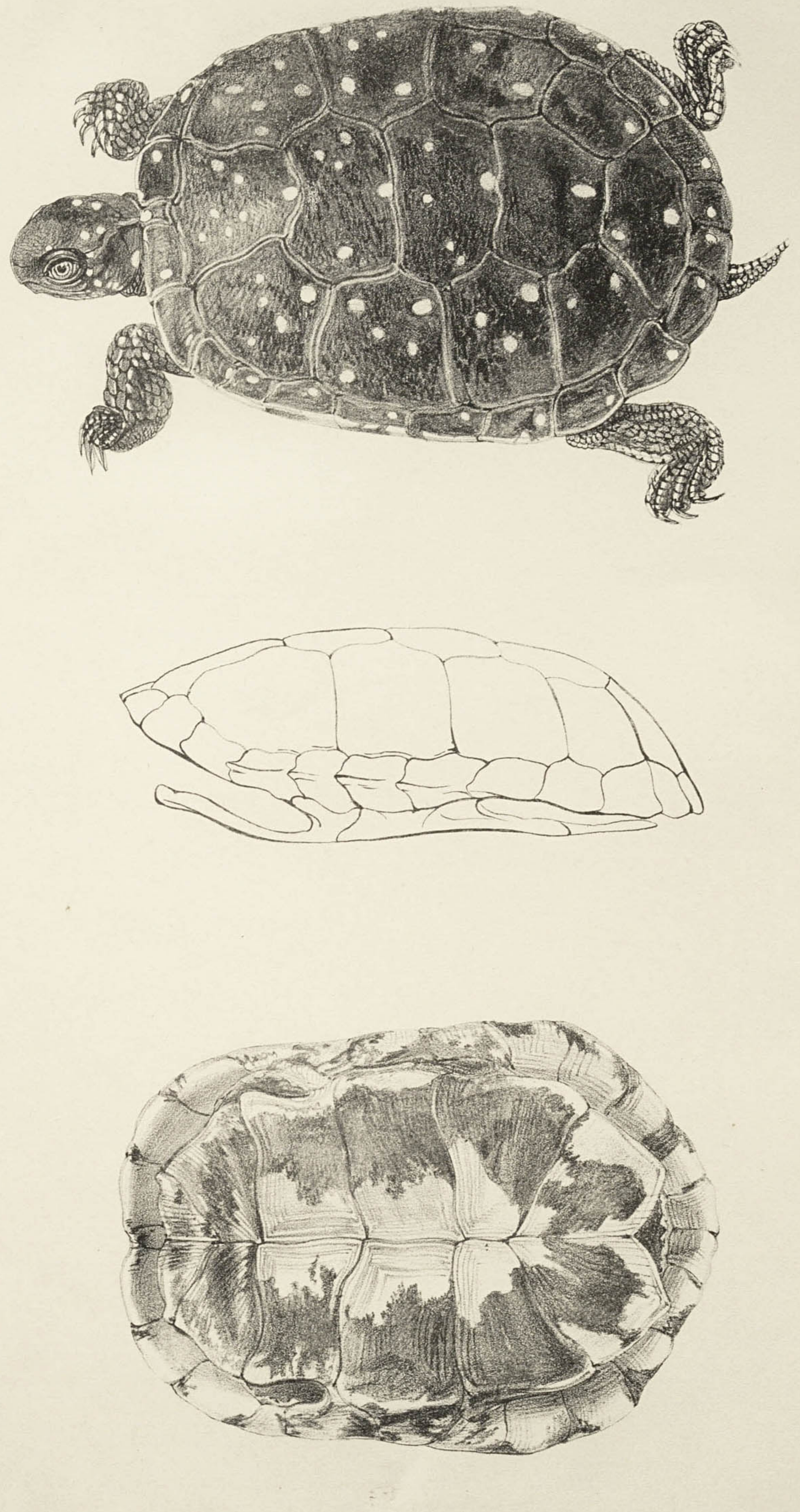
J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

TERRAPENE AMBOINENSIS.

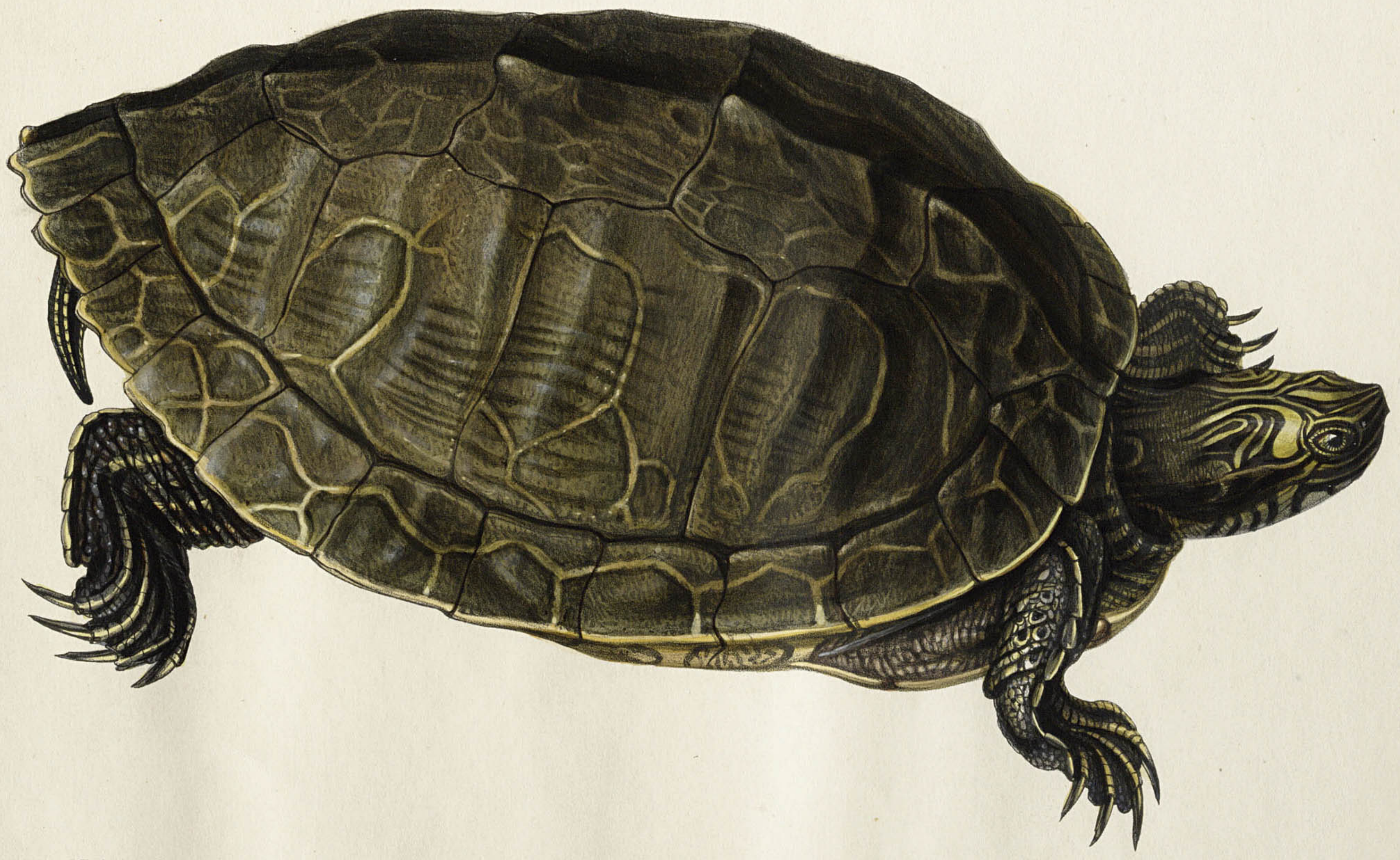
J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.



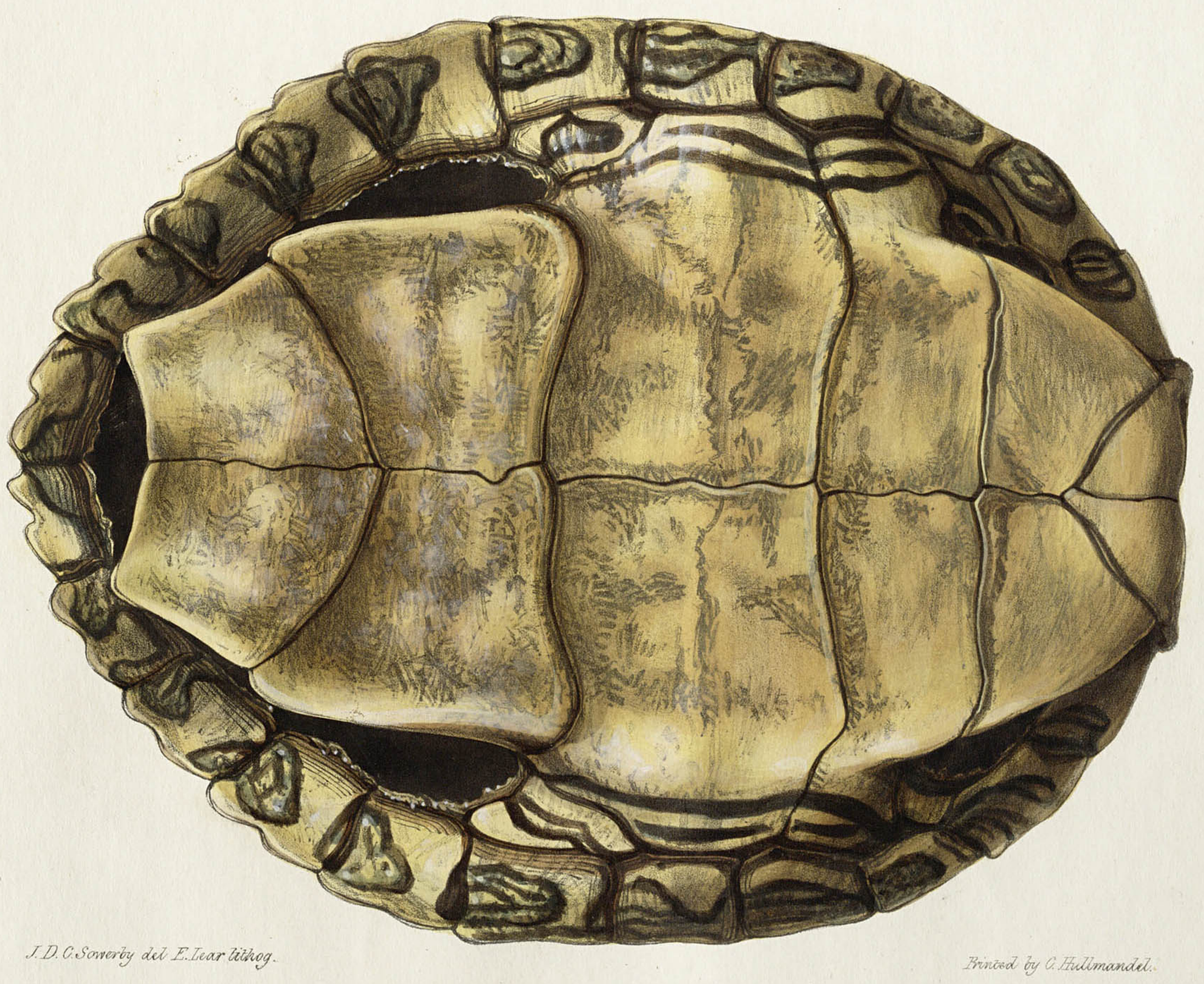
EMYS GUTTATA.

J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.



J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.

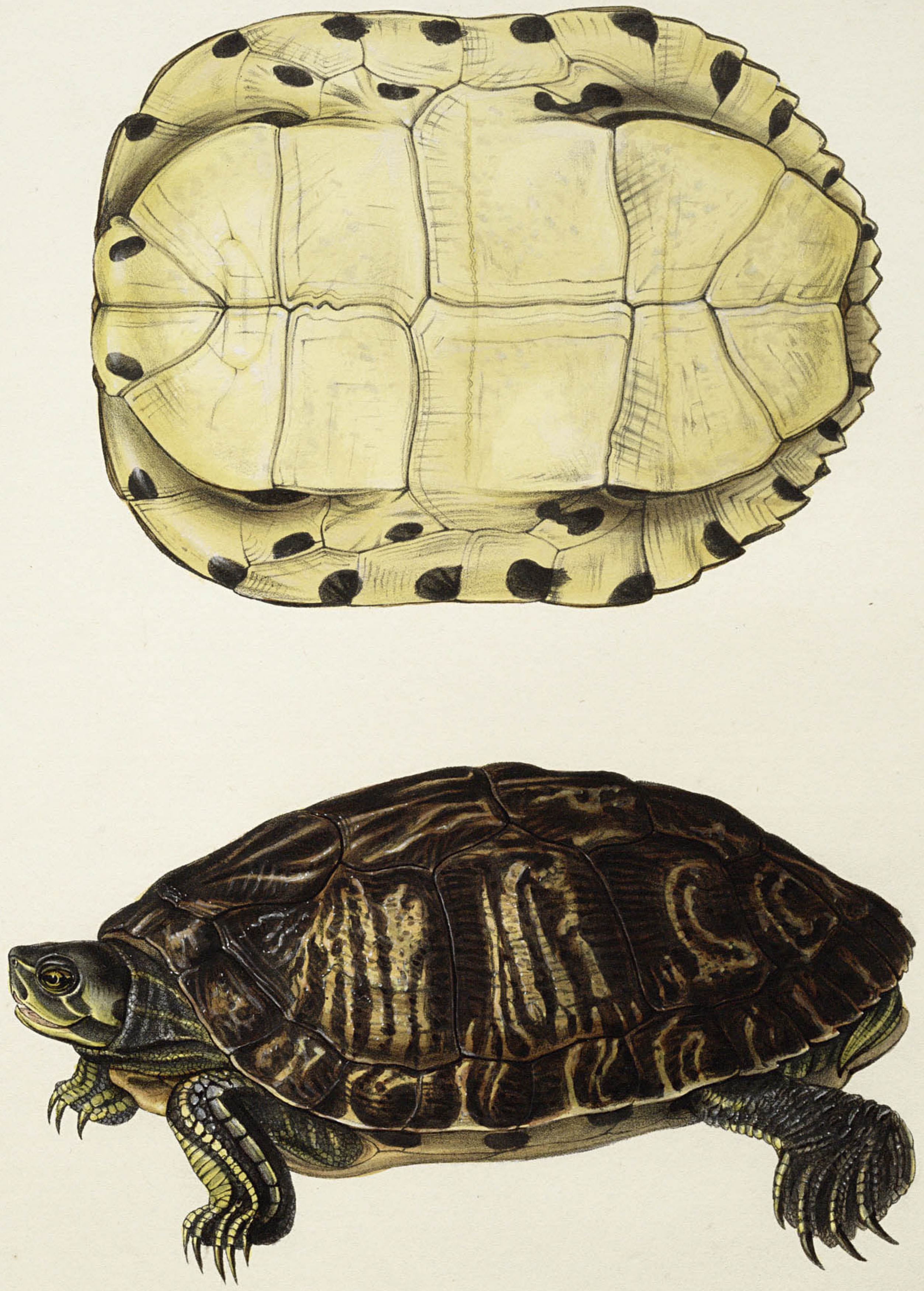
EMYS GEOGRAPHICA.



J. D. C. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

EMYS GEOGRAPHICA.

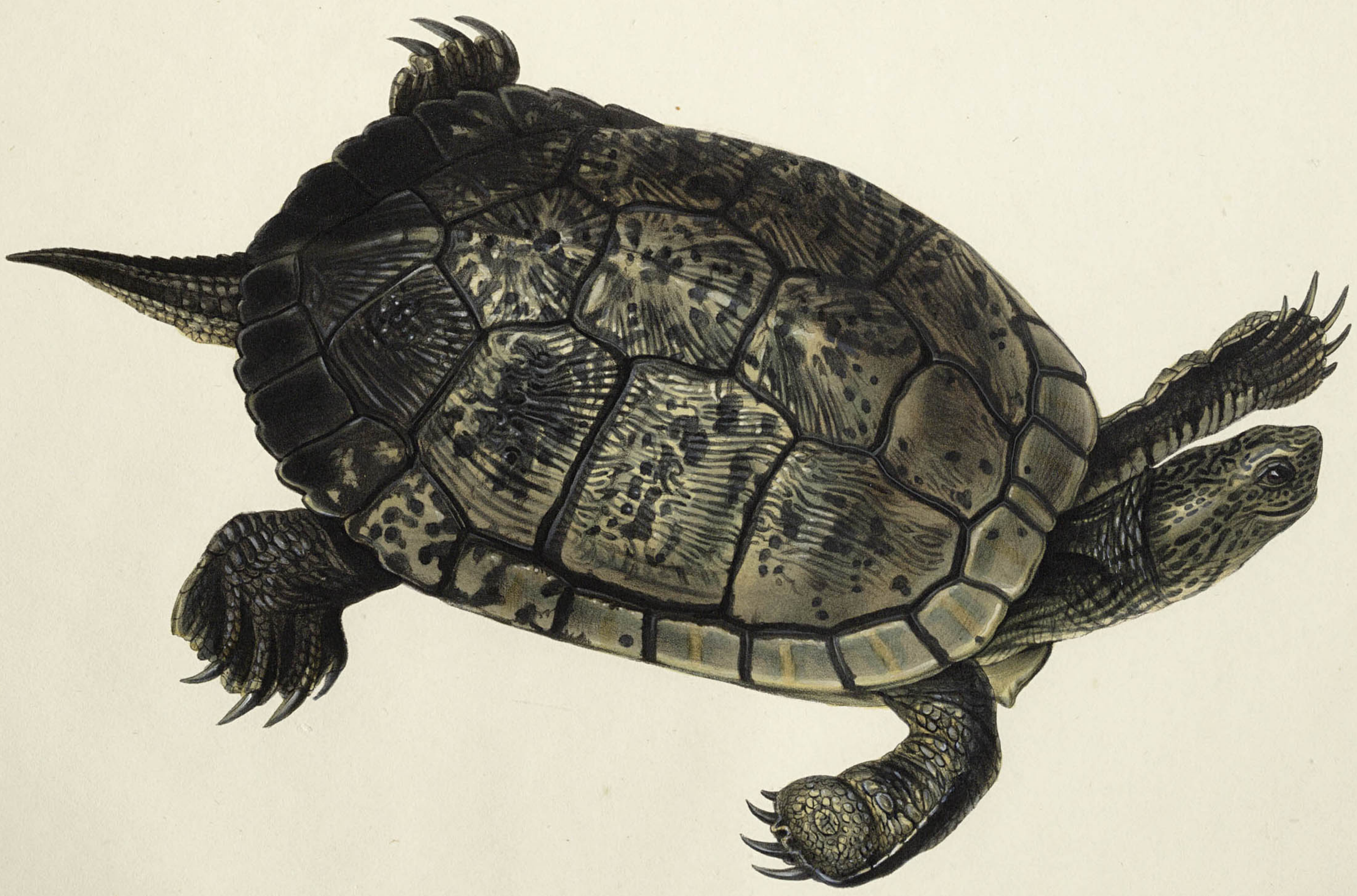


EMYS SERRATA. *Daudin.*

½ long: nat:

J. D. C. Sowerby del. E. Lear, lithog.

Printed by C. Hullmandel.



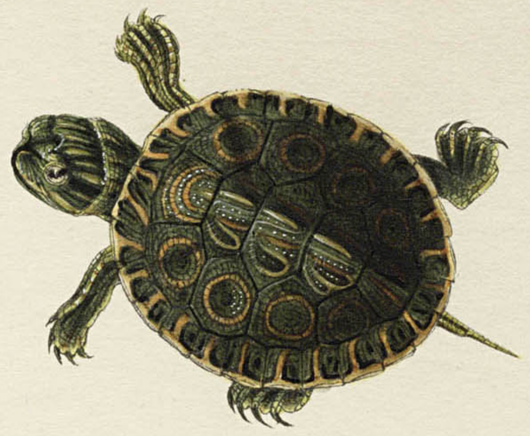
EMYS RUGOSA.

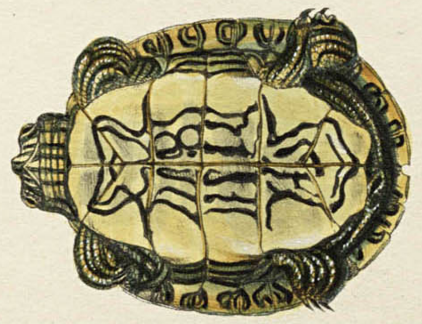
J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel.

EMYS RUGOSA.

J.D.C. Sowerby del. et lith. E. Lear lithog.

Printed by C. Hullmandel.

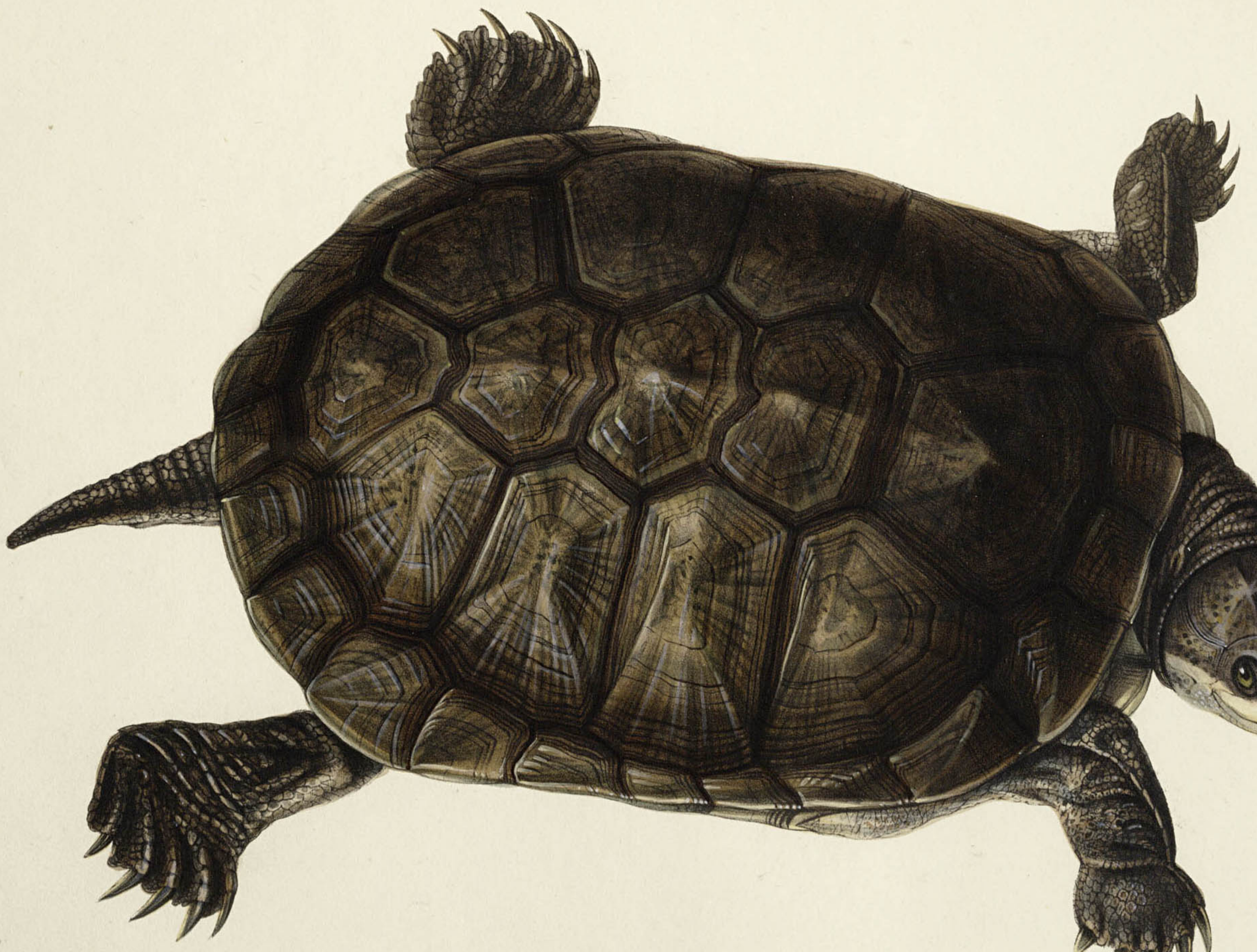




EMYS ORNATA, *Bell.*

very young

J. D. C. Sowerby del. E. Lear lithog. Printed by C. Hullmandel



HYDRASPIS GALEATA.

J. D. C. Sowerby del. E. Lear lithog. | Printed by C. Hullmandel.

HYDRASPIS GALEATA.

J. D. Sowerby del. E. Lear lithog.

Printed by C. Hullmandel.

TRIONYX GANGETICUS. *Cuv:*

J. D. C. Sowerby del. E. Lear lithog.

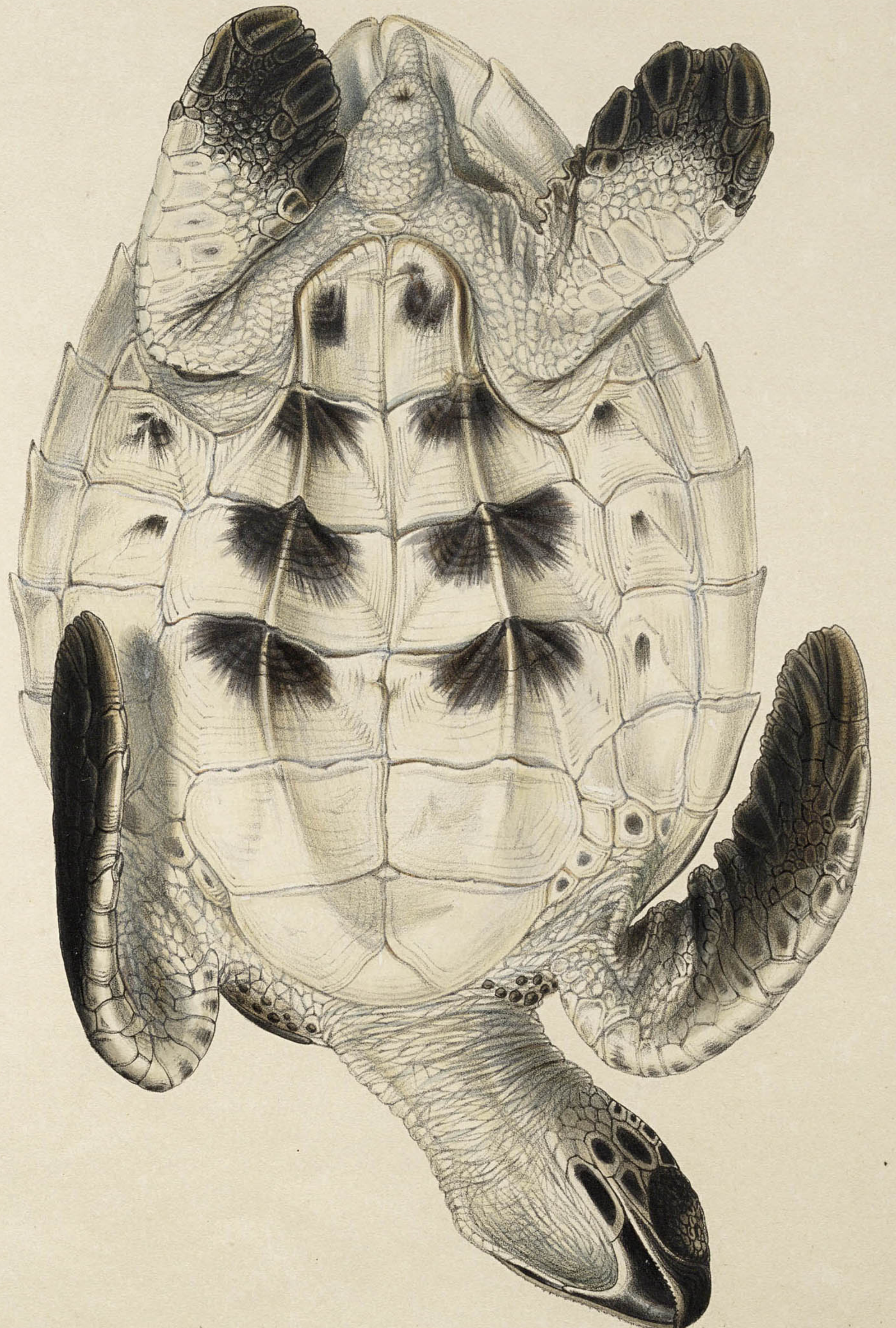
Printed by C. Hullmandel

CHELONIA IMBRICATA.

Young.

J. D. C. Sowerby, del. E. Lear, lithog.

Printed by C. Hullmandel



J. D. C. Sowerby del. E. Lear lithog.

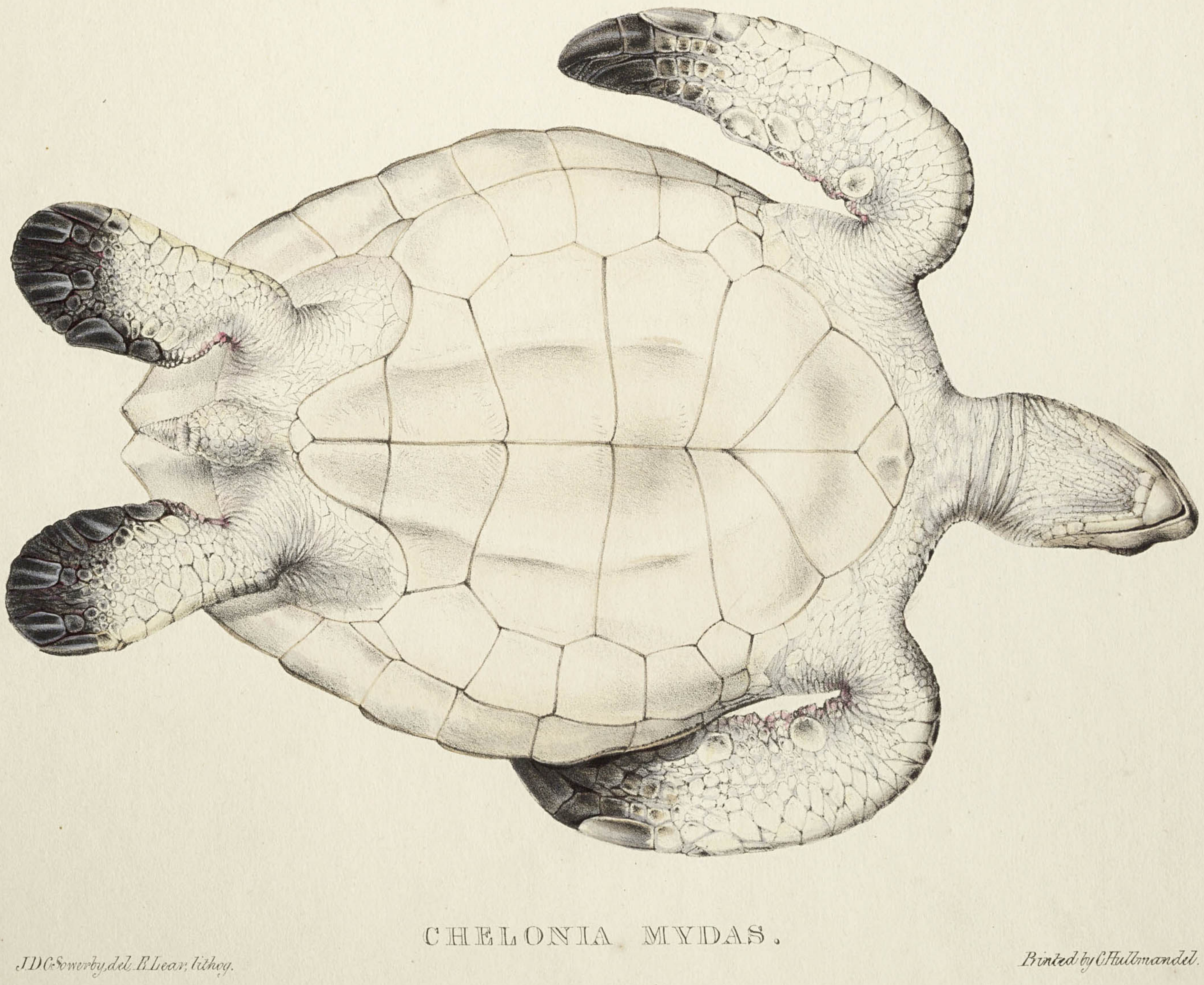
CHELONIA IMBRICATA.

Printed by C. Hullmandel.

CHELONIA MYDAS.

J. D. C. Sowerby, del. E. Lear, lithog.

Printed by C. Hullmandel.



J. D. C. Sowerby, del. E. Lear, lithog.

CHELONIA MYDAS.

Under Side.

Printed by C. Hullmandel.

Published by S. Highley, Fleet Street, London.

TORTOISES,

TERRAPINS, AND TURTLES

DRAWN FROM LIFE

BY

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AND

EDWARD LEAR.

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